Value Engineering Study Report

Project – CSNHS-M003-00(235)
DeKalb, Rockdale County

P.I. No. M003235

I-20/SR402 Corridor
Evans Mill Road to SR20/SR138

Preserve Roadway Integrity – Serviceability -- Safety

Value Management Team

PBSJ

Design Team:

GDOT
Keeping Georgia on the Move

January 2007

PBS&J

February 1, 2007

Lisa L. Myers
Design Review Engineer Manager
Georgia Department of Transportation
#2 Capitol Square, Room 266
Atlanta, GA 30334

RE: Re-Submittal of Value Engineering Study Report
Project Task Order No. 1 – Contract TOOESESV06796
Project No. CSNHS-M003-00(235) P.I. No. M003235
County Rockdale/Dekalb

Dear Ms. Myers:

We are pleased to submit this one (1) CD-ROM copy of the PDF version of the report and four (4) hard copies of the final value engineering report for the above noted project. This Value Engineering Study was performed during the week of January 8 - 11, 2007. The team fielded by PBS&J was able to identify thirty-one creative ideas and, in the end produced four alternatives that have the potential for affecting the cost of constructing these new facilities. In addition, the team has provided five design suggestions that could help create an even stronger end product as the design moves to construction.

We trust that you will find this report to be in proper order. It should be noted that the results of this workshop are volatile in that they can be overcome by the events that accompany the expeditious continuance of the design process. Accordingly, we encourage an equally expeditious implementation meeting to design the disposition of the contents of this report.

Thank you very much for this opportunity to work with you and the hard working staff of the Georgia Department of Transportation.

Yours truly,

PBS&J

Charles R. McDuff, PE, CVS, CCE
Project Manager

Certified Value Specialist - Life
Certification No. 820102

Value Engineering Study Report

I-20/SR402 Corridor
Evans Mill Road to SR20/SR138
DeKalb, Rockdale County

Table of Contents

Executive Summary

INTRODUCTION

This report summarizes the analysis and conclusions by the PBS&J Value Engineering workshop team as they performed a VE study during the period of January 8 - 11, 2007 in Atlanta, Georgia for the Georgia Department of Transportation. The subject of the Value Engineering study was the project for the rehabilitation of I-20/SR 402 from Evans Mill Road to SR 20. This rehabilitation consists primarily of deep milling and inlay, and other related measures. The design is being performed in-house by the staff of the Georgia Department of Transportation.

PROJECT DESCRIPTION

This project proposes deep milling and inlay, guardrail upgrades, and vegetation clearing of the I-20 corridor between Evans Mill Road and SR20/SR138. This project is approximately eight (8) miles in length. The project begins in DeKalb County at mile post 15.07 and reaches to the county line at mile post 17.59. The project continues in Rockdale County from mile log 0.00 and ends at mile log 5.02. The extent of the run of the project begins east of the City of Lithonia, DeKalb County, and ends in the City of Conyers, Rockdale County.

The expected cost of this construction is $49.490 million. More information about this project may be found in the tabbed section of this report entitled ***Project Description***.

VALUE ENGINEERING PROCESS

The Value Engineering Team followed the six step Value Engineering job plan as promulgated by SAVE International. This six step job plan includes the following:

- Information Phase
- Function Analysis Phase
- Creative/Brainstorming Phase
- Judgment or Evaluation Phase
- Development Phase
- Presentation Phase

This report is a component of the Presentation Phase. As part of the VE workshop in Atlanta, the team made an informal presentation of their results on the last afternoon of the workshop. This report is intended to formalize the workshop results and set the stage for a formal implementation meeting in which alternatives and design suggestions will typically be accepted, accepted with modifications, or rejected for cause. The worksheet that follows, along with the formally developed alternatives and design suggestions can be used as a "score sheet" for the implementation meeting. It is also included in this report to identify, on a summary basis, the results of the workshop. The reader is

encouraged to visit the third tabbed section of this report entitled ***Study Results*** for a review of the details of the study results. Tabbed section number four, ***Project Description,*** includes information about the project itself and tabbed section number five, ***Value Engineering Process*** goes into more detail about the process of Value Engineering, as used in this workshop.

STUDY RESULTS

During the creative phase the VE team identified **31** ideas that appeared to hold potential for either reducing construction cost, improving the end product or reducing the difficulty and time of project delivery. These were derived from the major cost headings for the project. These cost headings included:

- **PAVEMENT REPLACEMENT (P)**
- **RUMBLE STRIPS (R)**
- **TRAFFIC CONTROL (T)**
- **CONCRETE BARRIERS (C)**
- **GUARDRAIL (G)**
- **RAISE BRIDGE (B)**
- **MISCELLANEOUS (M)**

After the evaluation phase was completed, **4** alternatives and **5** design suggestions remained for further consideration. This was the result of the evaluation process that is used to cull out many of the creative ideas for technical or cost reasons, as the team continued to do their work. These alternatives and design suggestions may be found, in their documented form, in the tabbed section of this report entitled ***Study Results***. From the work of the team, there appeared to be some significant cost savings that could result from continuing to make use of the existing median barriers and there was the potential to enhance the project delivery schedule both in the current project and in the future HOV lane project(s).

Again, as mentioned earlier, the following ***Summary of Alternatives and Design Suggestions***, coupled with the documentation of the developed alternatives in the tabbed section of the report entitled ***Study Results***, should provide the reader with the information required to fully evaluate the merits of the alternatives.

SUMMARY OF ALTERNATIVES & DESIGN SUGGESTIONS

FINAL DISPOSITION

Georgia Department of Transportation
Project -- CSNHS-M003-00(235)
I-20/SR 402 Corridor --Evans Mill Road to SR20/SR138

Alternative Number	Description of Alternative	Initial Cost Savings	Implemented Cost Savings/Disposition	FINAL DISPOSITION
	PAVEMENT REPLACEMENT (P)			
P-1	Extend working hours	$ 272,941		Response --
P-5	Continue to use 3/16"/FT. Cross Slope	$ 7,170,523		Response --
P-6	Selectively eliminate milling	Design Suggestion		Response --
	TRAFFIC CONTROL (T)			
T-6	Split traffic (Combine Stages 3 & 4)	Design Suggestion		Response --
	CONCRETE BARRIER (C)			
C-1	Retain all existing barriers	$ 6,579,070		Response --
C-6	Modify existing barrier for future widening	Design Suggestion		Response --
	GUARDRAIL (G)			
G-1	Selectively reuse guardrail	$ 30,359		Response --
	MISCELLANEOUS (M)			
M-1 & M-2	Streamlining construction work	Design Suggestion		Response --
M-4	Compatibility with future projects	Design Suggestion		Response --

Study Results

STUDY RESULTS

Introduction

This section includes the study results presented in the form of fully developed value engineering alternatives that include descriptions of the original design, description of the alternative design configurations, comments on the technical justifications, opportunities and risks associated with the alternatives, sketches, calculations and technical justification for these alternatives. For the most part, these fully developed alternatives represent an array of choices that clearly could have an impact on the eventual cost and performance of the finished project.

The documented alternatives also include Design Suggestions. As their name implies, these are short write-ups making note of VE perspectives on technical issues and sharing some thoughts for consideration as the design moves forward.

This introductory sheet is followed by a table that summarizes the Alternatives and Design Suggestions documents that follow shortly thereafter. It should be noted that the alternatives that are included, which have cost estimates attached are not necessarily representative of the final cost outcome for each alternative. Some of these alternatives have components that are mutually exclusive so they may not be added together.

The users of this report are asked to consider these alternatives and design suggestions as a smorgasbord of choices for selection and use as the project moves forward. The enclosed *Summary of Alternatives & Design Suggestions* may also be used as a "score sheet" within the bounds of an implementation meeting.

Cost Calculations

The cost calculations are intended only as a guide to the approximate results that might be expected from implementation of the alternatives. They should be helpful in making clear choices as to the pursuit of individual alternatives.

The composite mark-up of 10% for the construction cost comparisons was derived from the cost estimate for the project. This estimate can be found in the section of this report entitled ***Project Background***.

SUMMARY OF ALTERNATIVES & DESIGN SUGGESTIONS

FINAL DISPOSITION

Georgia Department of Transportation
Project – CSNHS-M003-00(235)
I-20/SR 402 Corridor –Evans Mill Road to SR20/SR138

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G-1	Selectively reuse guardrail	$ 30,359		Response --
	MISCELLANEOUS (M)			
M-1 & M-2	Streamlining construction work	Design Suggestion		Response --
M-4	Compatibility with future projects	Design Suggestion		Response --

Value Analysis Design Alternative

PBSJ

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation**
P.I. Number: M003235 – DeKalb and Rockdale Counties

ALTERNATIVE NO.: **P-1**

DESCRIPTION: **EXTEND WORKING HOURS**

SHEET NO.: 1 of 4

Original Design:

The current working rules call for allowing the contractor to have single-lane closures at the following times:

Week Days	7:00pm to 5:00am
Weekends	Friday 7:00pm to Monday 5:00 am

Double-lane closures are based on:

Weekdays	11:00 pm to 5:00am
Friday	8:00 pm to Saturday 8:00am
Saturday	8:00 pm to Sunday 8:00am
Sunday	8:00pm to Monday 5:00am

Alternative:

The proposed working rules call for allowing the contractor to have single-lane closures at the following times:

Weekdays	7:00pm to 7:00am Eastbound
	5:00pm to 5:00am Westbound
Weekends	Friday 7:00pm to Monday 5:00 am

Double-lane closures are based on:

Weekdays	10:00pm to 6:00am Eastbound & Westbound
Friday	8:00pm to Saturday 10:00am
Saturday	8:00pm to Sunday 11:00am
Sunday	8:00pm to Monday 5:00am

Opportunities:

- Increased production
- Shorter Construction Duration
- Potential cost savings

Risks:

- May experience more complaints from public
- Will have to provide additional off-hour construction oversight

Technical Discussion:

On single-lane closures, it is proposed to take advantage of the difference in traffic intensities between am and pm traffic volumes, to permit some added time for construction. The construction staging requires opening all lanes at specified times. The milling and asphalt laydown crews will only be able to work a portion of the time while the lanes are closed. This is due to ramp-up activities required for each operation start, which only commence after the lanes have been closed. By closing lanes for longer durations each time they are closed, the contract should be able to realize more efficient use of the lane shutdown. The calculation sheets indicate that the construction duration for the project could be reduced by approximately four weeks. This will reduce construction cost and time of construction oversight.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 6,498,564	$	$ 6,498,564
ALTERNATIVE	$ 6,225,623	$	$ 6,225,623
SAVINGS	$ 272,941	$	$ 272,941

Calculations

PBSJ

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation** ALTERNATIVE NO.: P-1

P.I. Number: M003235 – DeKalb and Rockdale Counties

DESCRIPTION: SHEET NO.: 2 of 4

CONTRACT WORK TIME - SINGLE LANE CLOSURE

WEEKDAY	40 HRS
WEEKEND	58 HRS

CONTRACT WORK TIME - DOUBLE LANE CLOSURE

WEEKDAY	24 HRS
WEEKEND	33 HRS

ASSUME ONE HALF OF THE WORK WILL REQUIRE SINGLE LANE CLOSURES AND ONE HALF OF THE WORK WILL REQUIRE DOUBLE LANE CLOSURES, THE AVERAGE WORK WEEK = 77.5 HRS

PROPOSED WORK TIME - SINGLE LANE CLOSURE

WEEKDAY	48 HRS
WEEKEND	58 HRS

PROPOSED WORK TIME - DOUBLE LANE CLOSURE

WEEKDAY	32 HRS
WEEKEND	38 HRS

UTILIZING SAME ASSUMPTIONS AS ABOVE, THE AVERAGE WORK WEEK = 88 HRS

PROPOSED WORK TIME CHANGES WILL RESULT IN AN INCREASE OF 10.5 HRS PER WEEK

ASSUMING 150 TONS / HR FOR ASPHALT LAYDOWN AND ONLY 75% OF LANE CLOSURE WILL BE UTILIZED FOR ASPHALT LAYDOWN DUE TO REQUIRED COORDINATION WITH MILLING OPERATION, AN INCREASE OF 8 HRS OR 1200 TONS WILL BE REALIZED FOR EACH WEEK

Calculations

PBSJ

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation** ALTERNATIVE NO.: P-1

P.I. Number: M003235 – DeKalb and Rockdale Counties

DESCRIPTION:

CONTRACT WORK TIMES

77.5 HRS @ 75% – 58 HRS

150 TONS / HR – 8700 TONS / WEEK

PROPOSED WORK TIMES

88 HRS @ 75% – 66 HRS

150 TONS / HR – 9900 TONS / WEEK

TOTAL CONTRACT TONNAGE - 312 200 TONS

CONTRACT - ESTIMATE DURATION

312200 ÷ 8700 = 35.9 WEEKS (7 DAY)

PROPOSED - ESTIMATED DURATION

312 200 ÷ 9900 = 31.5 WEEKS (7 DAY)

COST WORKSHEET

PROJECT:	CSNHS-M003-00(235) -- Georgia D.O.T.	ALTERNATIVE NO.:	P-1
DESCRIPTION:		SHEET NO.:	4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Time Related Work Items:							
Traffic Control (150-1000)	LS	1	$ 4,000,000	$4,000,000			
Field Engineers Office	EA	1	$ 74,000	$74,000			
Maintenance of Temp Silt Fence	LF	38,600	$ 2.05	$79,130			
Contractor Main Office O.H.	LS	1	$ 1,754,655	$1,754,655			
Traffic Control (150-1000)	LS	(See Note 2)			1		$3,832,000
Field Engineers Office	LS	(See Note 2)			1		$70,892
Maintenance of Temp Silt Fence	LS	(See Note 2)			1		$75,806
Contractor Main Office O.H.	LS	**(See Notes 2 & 3 below)**			1		$1,680,959
Notes:							
1. It is assumed that there will a one month construction schedule duration reduction.							
2. This equates to a reduction of 4.2% in cost due to a reduction in time-related costs.							
3. Contractor main office overhead would normally be about 3.9% of $44,991,171							
Sub-total				$5,907,785			$5,659,657
Mark-up at 10.00%				$590,779			$565,966
TOTAL				**$6,498,564**			**$6,225,623**

Value Analysis Design Alternative

PBSJ

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation**
P.I. Number: M003235 – DeKalb and Rockdale Counties

ALTERNATIVE NO.: **P-5**

DESCRIPTION: **CONTINUE TO USE 3/16"/FT. CROSS SLOPE**

SHEET NO.: 1 of 4

Original Design:

The original calls for changing the mainline cross slope from 3/16"/ft. (existing) to 2% (1/4"/ft.).

Alternative:

The suggested alternative design is to maintain the existing 3/16"/ft. cross slope.

Opportunities:

- Initial cost savings
- Will reduce asphalt quantity
- Will eliminate the need to adjust drop inlet grade
- Will keep the inside shoulder 3" below the median barrier reveal line

Risks:

- Loss of the minimal cross slope pavement drainage improvement attributes that the slight cross slope increase would provide
- Some minimal redesign

Technical Discussion:

The change in cross slope is accomplished by holding the outside edge of travel lane and increasing the cross slope toward the median; raising the Profile Grade Line by 1.26". This requires an additional 6,420 tons of asphalt. Increasing the cross slope by less than 1/16"/foot will only minimally improve drainage. Since the design also calls for the PEM surface treatment, cross drainage should be significantly improved.

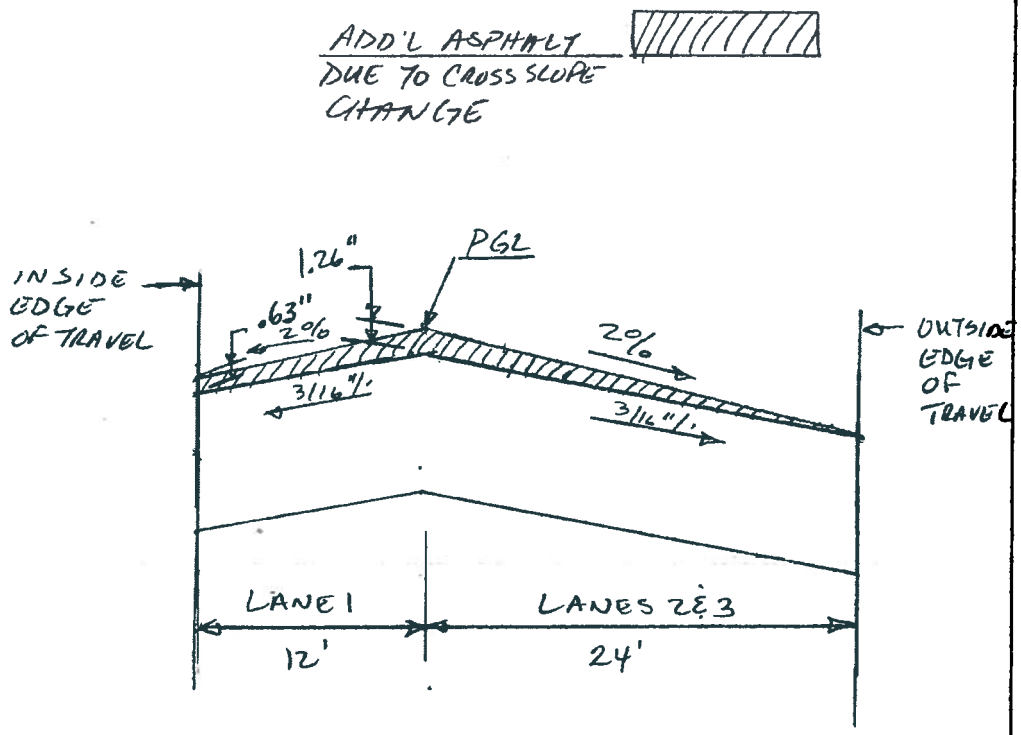
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 26,330,983	$	$ 26,330,983
ALTERNATIVE	$ 19,160,460	$	$ 19,160,460
SAVINGS	$ 7,170,523	$	$ 7,170,523

Illustrations

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation** ALTERNATIVE NO.: P-5

P.I. Number: M003235 – DeKalb and Rockdale Counties

DESCRIPTION: CHANGE CROSS SLOPE FROM 3/16IN/FT TO 2% (1/4IN/FT) SHEET NO.: 2 of 4



Calculations

PBSJ

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation** ALTERNATIVE NO.: P-5

P.I. Number: M003235 – DeKalb and Rockdale Counties

DESCRIPTION: CROSS SLOPE CHANGE FROM 3/16 in/ft to 2% (1/16 in/ft) SHEET NO.: 3 of 4

Assumptions: 1) Grade at outside edge travel lane, shoulder break point, will match existing grade

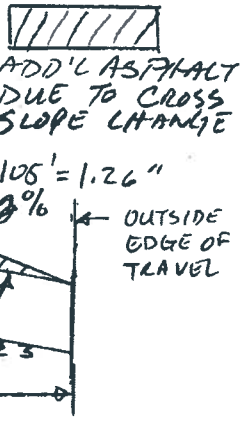
2) weight of asphalt = 110 lb/sqyd/in

3) 60% project length in tangent section

$24(.02) = .48'$

$24(.1875) = .315'$

$.105'$



ADDITIONAL ASPHALT

LANE 1 $\frac{1.26+.63}{2} = .945$" $.945 \times 110 = 103.95$ lb/sqyd

$\frac{12(7.52)(5280)(.60)}{9} = 31764.48$ sqyd

$31764.48 \times 103.95 = 3301917.696$ lb $= 1650.96$ TN

LANES 2 & 3 $\frac{1.26+0}{2} = .63$" $.63 \times 110 = 69.3$ lb/sq yd

$\frac{24(7.52)(5280)(.60)}{9} = 63528.96$ sq yd

$63528.96 \times 69.3 = 4402556.928$ lb $= 2201.28$ TN

$1650.96 + 2201.28 = 3852.24 = 3852$ TN

DIVIDE EQUALLY BETWEEN 402-3121 & 402-3196

COST WORKSHEET

PROJECT:	CSNHS-M003-00(235) -- Georgia D.O.T.	ALTERNATIVE NO.:	P-5
DESCRIPTION:		SHEET NO.:	4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
25mm Superpave	TN	137600	$ 75.00	$ 10,320,000	135674	$ 75.00	$ 10,175,550
19mm Superpave	TN	98500	$ 75.00	$ 7,387,500	96574	$ 75.00	$7,243,050
Adjust Drop Inlet to Grade	EA	86	$ 1,304.72	$ 112,206			
Remove exist conc barriers	LF	30340	$ 37.97	$ 1,152,010			
Install new concrete barriers	LS	1		$4,965,541			
Sub-total				$23,937,257			$17,418,600
Mark-up at 10.00%				$2,393,726			$1,741,860
TOTAL				**$26,330,983**			**$19,160,460**

Value Analysis Design Suggestion

PBSJ

PROJECT:	**CSNHS-M003-00(235) – Georgia Department of Transportation** **P.I. Number: M003235 – DeKalb and Rockdale Counties**	ALTERNATIVE NO.:	**P-6**
DESCRIPTION:	**SELECTIVELY ELIMINATE MILLING**	SHEET NO.:	1 of 1

Original Design:

The original design proposed deep milling and inlay for the entire length of the project.

Alternative:

Consideration might be given to resurfacing the existing pavement in lieu of deep milling and inlay, at select locations where the existing pavement is known to be in better condition.

Opportunities:

- Initial cost savings
- Would reduce the cost of milling asphalt pavement and inlaying (reduces the number of layers of pavement to be placed)
- Could reduce the time of construction

Risks:

- Inconsistent existing pavement conditions will complicate the implementation of this alternative
- The condition of the existing pavement is somewhat unknown. Would require added field analysis to implement this alternative
- Additional design may be necessary to ensure a smooth profile is achieved when transitioning from milled section to non-milled section.

Technical Discussion:

Although the majority of the pavement within the project is considered to be in poor or fair condition, additional analysis of the existing pavement may reveal that some areas may be in fair to good condition. If this is the case, it is suggested to resurface the existing pavement instead of deep milling and inlay. Potential cost savings may be realized in reduced quantities of milling and asphalt pavement and, with the increased productivity for paving. However, the original design approach is more conservative and would likely yield more consistent results.

Value Analysis Design Suggestion

PBSJ

PROJECT:	**CSNHS-M003-00(235) – Georgia Department of Transportation** **P.I. Number: M003235 – DeKalb and Rockdale Counties**	ALTERNATIVE NO.:	**T-6**
DESCRIPTION:	**SPLIT TRAFFIC (COMBINE STAGES 3 &4)**	SHEET NO.:	1 of 4

Original Design:

The design assumes that Stage 3 traffic will be shifted to the outside shoulder, permitting the reconstruction of Lane 2 with lane closures in Lane 3. Traffic will be down to one lane.

Stage 4 traffic shifted to the original configuration. This will permit the reconstruction of Lane 3 with lane closures in Lane 2. Traffic will be down to one lane.

Alternative:

The alternative would call for combining Stages 3 and 4 in a split traffic pattern. In this combined Stage, traffic will be placed in Lane 1, the outside shoulder, and either Lane 2 or 3, for a total of three lanes of traffic during non-work hours. With either Lane 2 or 3 permanently closed during non-work hours, single lane closures will provide access to both Lanes 2 and 3 during construction hours. Trucks will be instructed to utilize the outside shoulder during this stage.

Opportunities:

- Will eliminate one stage of construction
- Will provide access to Lanes 2 and 3 at same time

Risks:

- Close proximity of traffic to work zone
- Signage, pavement markings, and message signs will have to be well done to avoid motorist confusion

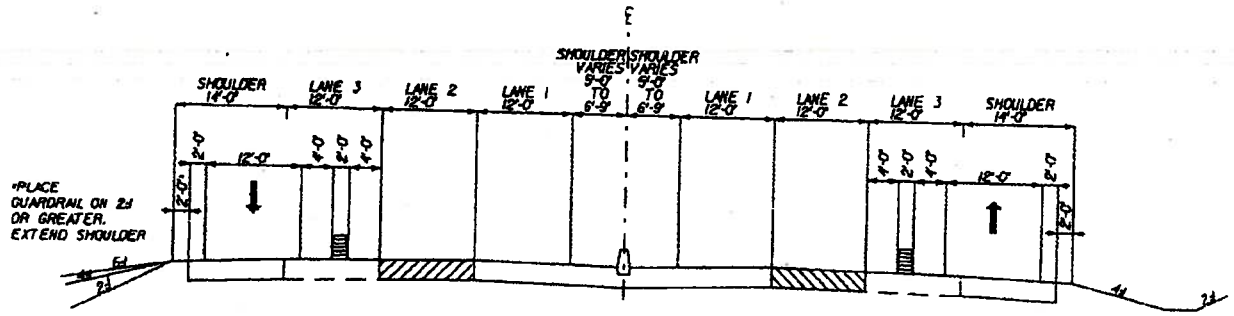
Technical Discussion:

This is not the most desirable traffic handling procedure but could be beneficial on a limited basis.

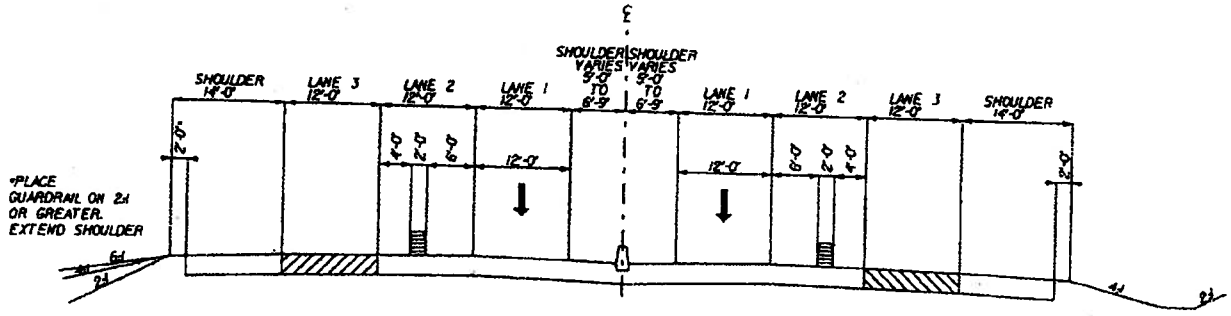
PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation** ALTERNATIVE NO.: T-6

P.I. Number: M003235 – DeKalb and Rockdale Counties

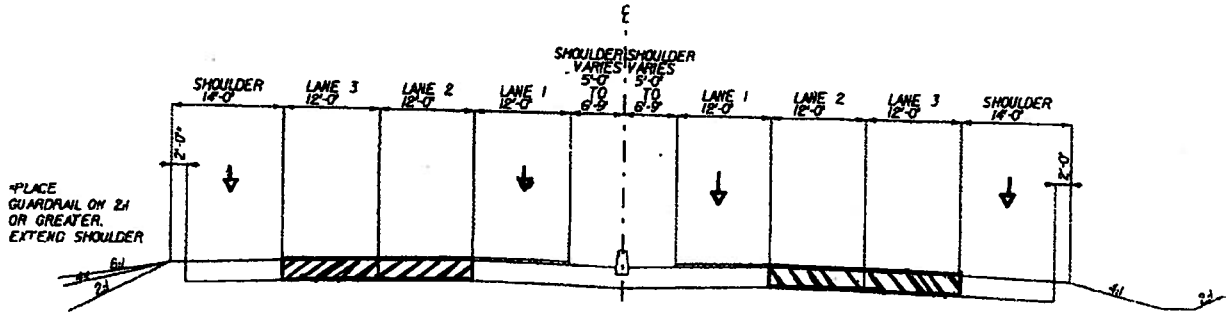
DESCRIPTION: SPLIT TRAFFIC (COMBINE STAGES 3&4) SHEET NO.: 2 of 4



EXISTING STAGE 3



EXISTING STAGE 4



PROPOSED COMBINED STAGES WITH SPLIT TRAFFIC (See Next Page)

Illustrations

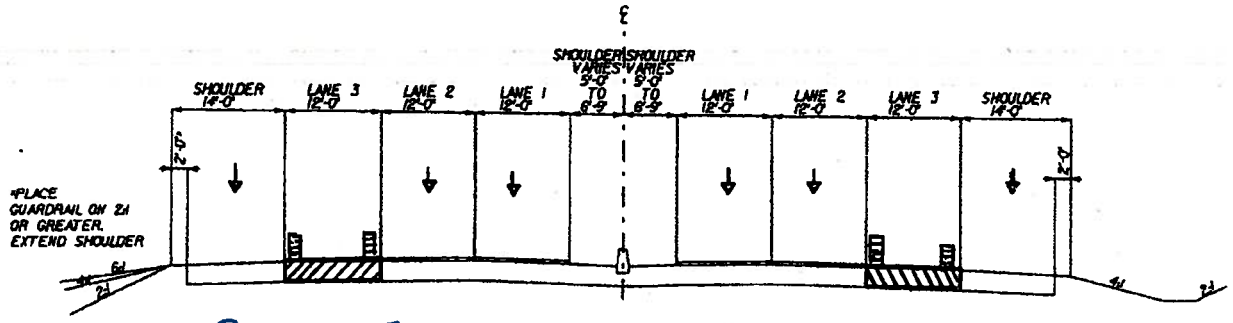
PBSJ

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation** ALTERNATIVE NO.: T-6

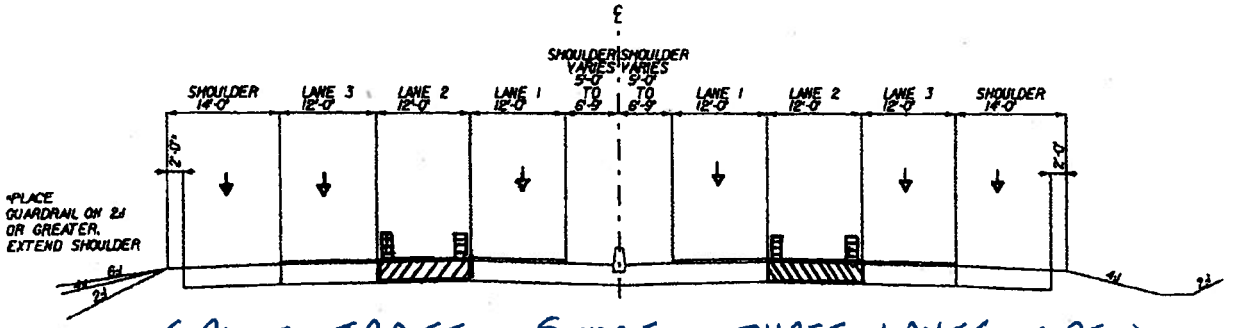
P.I. Number: M003235 – DeKalb and Rockdale Counties

DESCRIPTION:

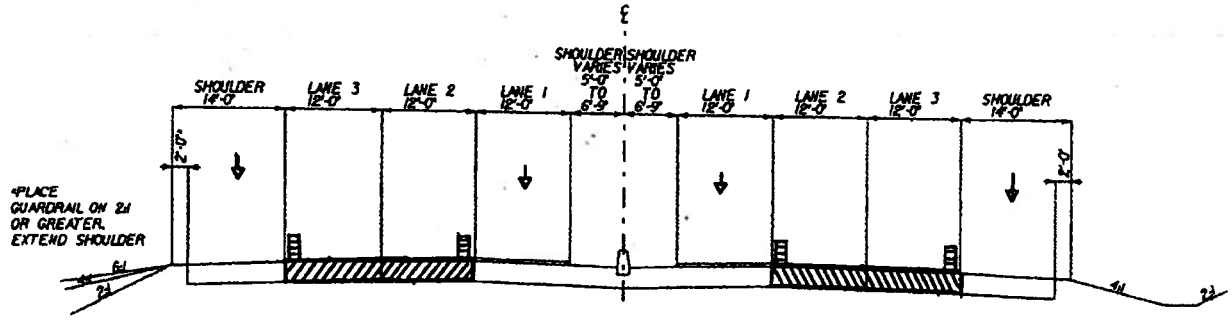
SHEET NO.: 3 of 4



SPLIT TRAFFIC STAGE – THREE LANES OPEN LANE 3 PERMANENTLY CLOSED



SPLIT TRAFFIC STAGE - THREE LANES OPEN LANE 2 PERMANENTLY CLOSED



SPLIT TRAFFIC STAGE - SINGLE LANE CLOSURE CONSTRUCTION ACTIVE IN LANES 2 OR 3

Calculations

PBSJ

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation** ALTERNATIVE NO.: T-6

P.I. Number: M003235 – DeKalb and Rockdale Counties

DESCRIPTION: SPLIT TRAFFIC (COMBINE STAGES 3&4) SHEET NO.: 4 of 4

DUE TO ELIMINATION OF STAGE 3 AND 4 AND REPLACEMENT WITH THE COMBINED STAGE, IT WILL SAVE TEMPORARY TRAFFIC STRIPING AND RPM'S FOR TWO LANE LINES IN EACH DIRECTION

PROJECT LENGTH 7.54 MILES
No. OF LANE LINES 4

7.54 x 5280 x 4 = 159 244.8 l.f.
RPM SPACING - 80 lf
159 244.8 ÷ 80 = 1991 each - RPM's

ESTIMATED COST
TEMPORARY TRAFFIC STRIPE $0.50 / l.f.
RPM's $4.00 ea

DUE TO ELIMINATION OF STAGE 3 AND 4, THERE WILL BE A TIME SAVINGS FROM THE ELIMINATION OF ONE TRAFFIC SHIFT IN EACH DIRECTION

ESTIMATED TIME TO RESTRIPE AND SHIFT TRAFFIC - 1 DAY PER DIRECTION

Value Analysis Design Alternative

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation**
P.I. Number: M003235 – DeKalb and Rockdale Counties

ALTERNATIVE NO.: **C-1**

DESCRIPTION: **RETAIN ALL EXISTING BARRIERS**

SHEET NO.: 1 of 4

Original Design:

In the original design there is to be a change of cross-slope to 2% (1/4"/ft.) from the existing 3/16"/ft. This has the effect of raising the Profile Grade Line (PGL) elevation. The way in which the cross-slope is handled currently requires the replacement of the median barrier.

Alternative:

It is suggested that the design be changed so that the cross-slope of the inside shoulder maintains the full height, 3 inches, to the barrier reveal line. This would allow the concrete median barrier to be retained.

Opportunities:

- Initial cost savings due to the reduction in median barrier wall removal and replacement
- Should help to reduce the construction duration

Risks:

- The construction details for the currently proposed median barrier is different from the existing Jersey Barrier
- The barriers may have to modified or replaced as part of the future HOV project

Technical Discussion:

By increasing the slope of the inside shoulder to approximately 7%, the shoulder grade could be set to provide the full 3" height to the barrier reveal line. With the 2% downward slope of Lane 1 (3/16"/ft.), the breakover would be less than the maximum 8%, and the existing barriers could be retained.

It is possible that the savings indicated below might be reduced should some of the existing concrete barriers require some repair or modification to extend their service life.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 6,579,070	$	$ 6,579,070
ALTERNATIVE (Assumes full length savings)	$ 0	$	$ 0
SAVINGS	$ 6,579,070	$	$ 6,579,070

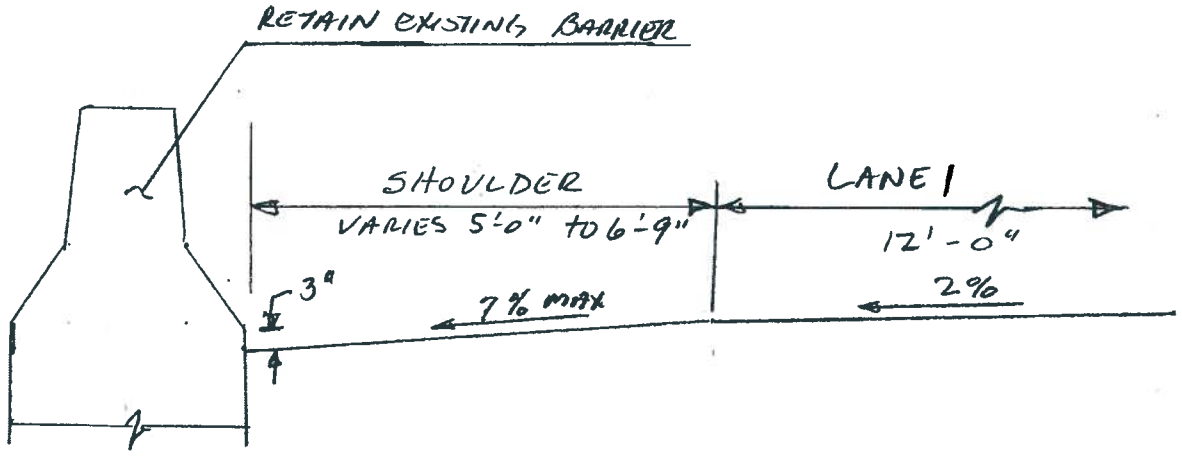
Illustrations

PBSJ

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation** ALTERNATIVE NO.: C-1

P.I. Number: M003235 – DeKalb and Rockdale Counties

DESCRIPTION: Retain all Existing Barrier SHEET NO.: 2 of 4



Calculations

PBS&J

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation** ALTERNATIVE NO.: C-1

P.I. Number: M003235 – DeKalb and Rockdale Counties

DESCRIPTION: Retain all existing barriers SHEET NO.: 3 of 4

Assumptions: 1) Cross slope = 2% tangent section Per typical section

2) Shoulder slope can be increased above 6%

Starting at outside edge of travel elevation = 0

$24(.1875) = 4.5"$ 3/16 in/ft original slope

$7.5"$ Pavement Depth

$12"$ Elevation at PGL (3/16 in/ft)

$24(.02)(12) - 4.5 = 1.26"$ Add'l from 2% cross slope

$13.26"$ Elevation at PGL (2%)

$12 - 12(.1875) = 9.75"$ Elevation at inside edge Travel lane (3/16")

$13.26 - 12(.02)(12) = 10.38"$ Elevation at inside edge Travel lane (2%)

$9.75 - 5(.06)12 = 6.15"$ Elevation at Barrier (3/16")

$\frac{10.38 - 6.15}{5(12)} = .0705 \rightarrow 7.05\%$ Req'd Shoulder slope

$\frac{10.38 - 6.15}{6.75(12)} = .0522$ 5.22%

COST WORKSHEET

PROJECT:	CSNHS-M003-00(235) -- Georgia D.O.T.	ALTERNATIVE NO.:	C-1
DESCRIPTION:		SHEET NO.:	4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Remove existing conc barriers	LF	30340	$ 37.97	$1,152,010			
Conc Barrier, Type 20	LF	19423	$ 128.00	$2,486,144			
Conc Barrier, Type 21	LF	4486	$ 153.50	$688,601			
Conc Barrier, Type 22	LF	5800	$ 285.21	$1,654,218			
Sub-total				$5,980,973			$0
Mark-up at 10.00%				$598,097			$0
TOTAL				**$6,579,070**			**$0**

Value Analysis Design Suggestion

PBSJ

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation**
P.I. Number: M003235 – DeKalb and Rockdale Counties

ALTERNATIVE NO.: **C-6**

DESCRIPTION: **MODIFY EXISTING BARRIER FOR FUTURE WIDENING**

SHEET NO.: 1 of 1

Original Design:

The original design calls for the replacement of the existing concrete Jersey-type median barriers with concrete barrier Types 20, 21, and 22, having the Jersey shape as detailed in Georgian DOT Standard Drawing 4940.

Alternative:

This alternative would call for the use of a median barrier with a Type "S" configuration, if the barriers are to be replaced.

Opportunities:

- This would be compatible with the future project
- Would avoid the cost of having to remove and replace the barriers being installed in the current project.

Risks:

- Potential slight increase in cost for barriers on the current project
- Potential for the barrier standard to change before the future project is constructed
- Some minimum redesign time required

Technical Discussion:

The "S" barrier design would accommodate resurfacing, overlays, etc., without modification, so no median work would be required under the future widening project. This should greatly simplify the future project and reduce construction time, traffic disruptions and cost of the future project.

Value Analysis Design Alternative

PBSJ

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation**
P.I. Number: M003235 – DeKalb and Rockdale Counties

ALTERNATIVE NO.: **G-1**

DESCRIPTION: **SELECTIVELY REUSE GUARDRAIL**

SHEET NO.: 1 of 2

Original Design:

The original design calls for the existing guardrail to be upgraded to current standards.

Alternative:

It suggested that consideration be given to the selective re-use of existing guardrail, posts, auxiliary items, and offset blocks that are in good condition and meet current standards.

Opportunities:

- Initial cost savings for the materials
- Reduces waste

Risks:

- Would require time to salvage these materials
-

Technical Discussion:

Re-using the existing guardrail and appurtenances that are in good condition and meet current standards is an excellent opportunity to recycle materials and reduce the cost of construction, while preserving the integrity, serviceability, and safety of the roadway.

See the next sheet for the calculation of the savings noted below.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 30,359	$	$ 30,359
ALTERNATIVE	$ 0	$	$ 0
SAVINGS	$ 30,359	$	$ 30,359

Calculations

PBSJ

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation** ALTERNATIVE NO.: G-1
P.I. Number: M003235 – DeKalb and Rockdale Counties

DESCRIPTION: SELECTIVELY REUSE GUARDRAIL SHEET NO.: 2 of 2

ORIGINAL ESTIMATE

GUARDRAIL, TP T	$33,894
GUARDRAIL, TP W	$137,736
GUARDRAIL ANCHORAGE, VARIOUS	$ 28,099
TOTAL =	$199,729

* ASSUME 80% OF COST IS FOR MATERIAL
20% OF COST IS FOR LABOR

MATERIAL COST = $199,729 x 0.80 = **$159,783**

ALTERNATIVE ESTIMATE

* ASSUME 20% OF EXISTING GUARDRAIL CAN BE REUSED

MATERIAL COST = $159,783 – ($159,783 x 0.20) = **$127,826**

MATERIAL COST SAVINGS = ORIGINAL – ALTERNATIVE
= $159,783 – $127,826
= $31,957

* ASSUME REUSED GUARDRAIL WILL HAVE TO BE RECONDITIONED AT A COST OF 5% OF SAVINGS

MATERIAL COST SAVINGS = $31,957 x 0.95
= $30,359

Value Analysis Design Suggestion

PBSJ

PROJECT:	**CSNHS-M003-00(235) – Georgia Department of Transportation** **P.I. Number: M003235 – DeKalb and Rockdale Counties**	ALTERNATIVE NO.:	**M-1 & M-2**
DESCRIPTION:	**STREAMLINING CONSTRUCTION WORK**	SHEET NO.:	1 of 1

Original Design:

It is assumed that the current design is headed toward a "standard" design/bid/build contract situation.

Alternative:

Consideration might be given to a completion incentive and the contractor might be offered an opportunity for lane-hour purchases. These items are explained below.

Opportunities:

- May enhance the chances of reducing the construction duration or receive slightly lower bids
-

Risks:

- Will require close attention contract details and execution of these time/cost saving measures
-

Technical Discussion:

Early Finish Dollar Incentives – most people are familiar with the pros and cons associated with an early finish dollar incentive. A relatively new wrinkle in this approach is that utilized by North Carolina DOT, i.e., they use what is called a "no excuses" early finish incentive on some of their more critical contracts. Basically, the contractor agrees that he will meet an accelerated project delivery date for a specified dollar amount. There is also identified a "normal' completion date. The contractor agrees that if he does not meet the early delivery date, for any reason, that he will forfeit the incentive payment.

Lane-hour purchases would mean that the Contractor would, in isolated instances, submit unusual lane closings that would be highly beneficial for the Contractor's execution of some particularly complex part of his scope. The State would identify the dollar value of the expenses associated with such a closure and make an offer to the contractor to purchase the right to close the lanes for the time and conditions specified. This can be highly beneficial for all parties concerned and help the contractor cope with problems not identified prior to bid submittals.

Value Analysis Design Suggestion

PBSJ

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation**
P.I. Number: M003235 – DeKalb and Rockdale Counties

ALTERNATIVE NO.: **M-4**

DESCRIPTION: **REVIEW DESIGN COMPONENTS FOR COMPATIBILITY WITH FUTURE PROJECTS IN THE AREA (I.E., HOV LANES)**

SHEET NO.: 1 of 1

Original Design:

The original design proposes deep milling and inlay, guardrail upgrades, replacement of concrete median barrier, reconstruction of inside shoulders to full depth, and reconstruction of the outside shoulders to full depth – 12 feet wide for future HOV implementation.

Alternative:

It is suggested to review the current project's proposed design features for compatibility with future projects in the area (i.e., I-20 from Evans Mill Road to Salem Road HOV Lanes).

Opportunities:

- Potential cost savings for design and construction of future projects

Risks:

- Information for future projects may be scarce at this time

Technical Discussion:

While plans for future projects in the area may be in the conceptual, preliminary, or final design phase, it is highly recommended to review the proposed design components for compatibility with the information available for these future projects, to the fullest extent possible. This suggestion may lead to potential cost savings during the design and construction of the future project.

Project Description

PROJECT DESCRIPTION

This project proposes the deep milling and inlay, guardrail upgrades, and vegetation clearing of the I-20 corridor between Evans Mill Road and SR20/SR138. The proposed project is approximately eight (8) miles in length. The project begins at Dekalb County mile log 15.07 and spans to the county line at mile log 17.59. The project continues in Rockdale County from mile log 0.00 and ends at mile long 5.02. The project begins east of the City of Lithonia, Dekalb County, and ends in the City of Conyers, Rockdale County.

The expected cost of this construction is $49.490 million. More detailed information about this project follows in the form of:

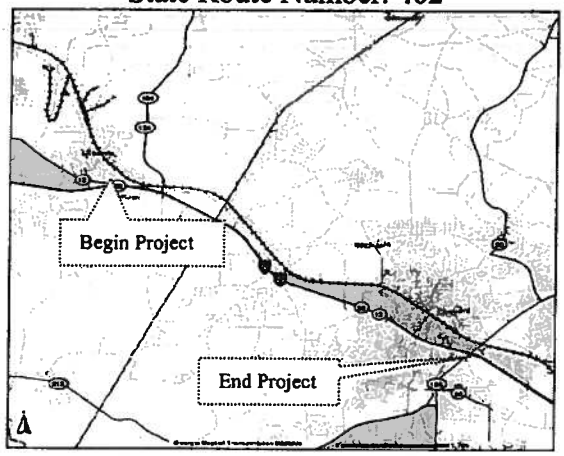
- Georgia Department of Transportation – Project Concept Report
    - Location Map
    - Need and Purpose
    - Description
    - Existing Design Features
    - Proposed Design Features
    - Project Responsibilities
    - Coordination
    - Scheduling
    - Cost Estimates
    - Typical Sections
    - Crash Summary
- Project Special Provision – **Section 150 – Traffic Control**

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

Office of Urban Design

PROJECT CONCEPT REPORT

Project Number: **CSNHS-M003-00(235)**
Dekalb and **Rockdale Counties**
P. I. Number: **M003235**
Federal Route Number: **I-20**
State Route Number: **402**



Recommendation for approval:

DATE _____ _____
Project Manager

DATE _____ _____
State Urban Design Engineer

The concept as presented herein and submitted for approval is consistent with that which is included in the Regional Transportation Improvement Program (RTP) and the State Transportation Improvement Program (STIP).

_____ _____
DATE State Transportation Planning Administrator

_____ _____
DATE State Transportation Financial Management Administrator

_____ _____
DATE State Environmental/Location Engineer

_____ _____
DATE State Traffic Safety & Design Engineer

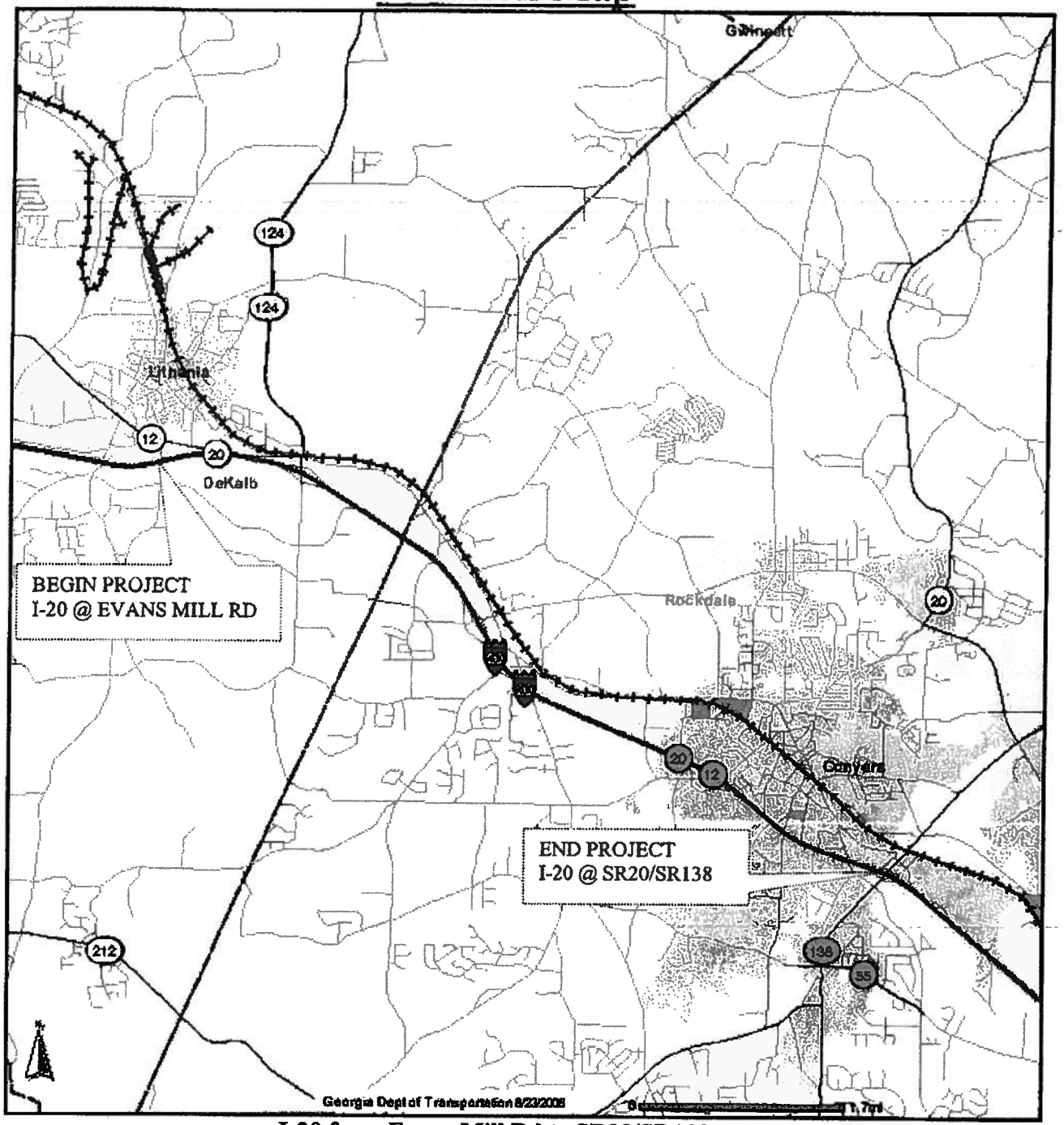
_____ _____
DATE District Engineer

_____ _____
DATE State Bridge Design Engineer

_____ _____
DATE Project Review Engineer

_____ _____
DATE State Maintenance Engineer

Location Map



I-20 from Evans Mill Rd to SR20/SR138

Need and Purpose: The primary purpose of this project is the rehabilitation of the existing roadway to preserve the integrity, serviceability, and safety of the interstate system. The majority of the pavement within the project is in poor to fair condition. This condition will continue to deteriorate as traffic grows. This project is the milling and resurfacing of I-20/SR 402 from Evans Mill Road to SR20/SR138. The existing guardrail will be upgraded to current standards and vegetation will be cleared according to current guidelines.

Description of the proposed project: The project proposes deep milling and inlay, guardrail upgrades, and vegetation clearing of the I-20 corridor between Evans Mill Road and SR20/SR138. The proposed project is approximately 8 miles long. The project begins in Dekalb County at mile log 15.07 and spans to the county line at mile log 17.59. The project continues in Rockdale County from mile log 0.00, and ending at mile log 5.02. The project begins east of the city of Lithonia, Dekalb County, and ends in the City of Conyers, Rockdale County.

Is the project located in a Non-attainment area? __X___ Yes ____ No
This project is a resurfacing project that will not add capacity to the corridor. It is exempt from Air Quality Analysis.

PDP Classification: Major _X_ Minor _____
Federal Oversight: Full Oversight (X), Exempt ( ), State Funded ( ), or Other ( )

Functional Classification: Interstate Principal Arterial

U. S. Route Number(s): I-20 **State Route Number(s):** SR 402

Traffic (AADT):
Current Year: (2007) 133,200 Design Year: (2027) 214,000

Existing design features:

- Typical Section: I-20 consists of 6 lanes, 3-12 foot lanes in each direction. Outside shoulders are 12 feet wide (10 feet paved). The inside shoulders vary from 5 feet to 6.75 feet paved. The median varies from 12.5 feet to 16 feet wide with a 2.5 feet median barrier.
- Posted speed: 65 mph
- Minimum radius for curve: 4775 ft.
- Maximum super-elevation rate for curve: 8%
- Maximum grade: 4.1%
- Width of right of way: 200-400 feet
- Major structures:

Bridge ID	Feature INT.	Type	Rating	Clearance	Concern
089-0305-A	SR124-Turner Hilll Rd	Overpass	94.86	18'2"	no
247-0023-A	CR66-Sigman Rd	Overpass	98.07	16'10"	no
247-0019-A	CR437-West Avenue	Overpass	89.74	15'11"	YES
247-5024-A	Parker Rd/Oakland Ave.	Overpass	92.12	18'3"	no

- Major interchanges or intersections along the project:
  - SR 124 – Turner Hill Road
  - CR 66 – Sigman Road
  - CR 437 – Klondike Rd / West Avenue

- Existing length of roadway segment for Dekalb County: 2.52 miles
  Beginning to End mile logs for Dekalb County: 15.07 to 17.59
  (State Mile Point MP 74.45 to MP 76.97)
- Existing length of roadway segment for Rockdale County: 5.02 miles
  Beginning to End mile logs for Rockdale County: 0.00 to 5.02
  (State Mile Point MP 76.97 to MP 81.99)

Proposed Design Features:

- Proposed typical section(s): The number of lanes and lane width will remain the same. Cross slopes will be improved from 3/16 in./ft. to 1/4 in/ft. and outside shoulders will be 12 ft. paved to serve as a future lane. Inside shoulders will be reconstructed to full depth with no change to existing width. The existing outside shoulders will be reconstructed to full depth 12 ft wide to facilitate staging and future HOV implementation. The pavement on the mainline and shoulders of the interchanges will be resurfaced up to the gore points.

- Proposed Design Speed Mainline: 70 mph
- Proposed Maximum grade Mainline: 4% Maximum grade allowable: 4 %.
- Proposed Maximum grade Side Street NA Maximum grade allowable 6 %.
- Proposed Maximum grade driveway NA
- Proposed Minimum radius for curve 4775 ft.
- Minimum radius allowable 1810 ft.
- Proposed Maximum super-elevation rate for curve: 8.0%
- Right of way: All work to be done within existing rights-of-way.
- Structures:
  - Bridges - The bridge on West Avenue/Klondike Rd, Bridge ID # 247-0019-A, will be jacked due to clearance requirements.
  - Major intersections and interchanges. No changes are proposed to the interchanges in the project area.

- Traffic control during construction: Traffic will be maintained through staged construction. Temporary lane closures will be required. Restricted work hours will be determined based on hourly counts.

- Design Exceptions to controlling criteria anticipated:

	UNDETERMINED	YES	NO
HORIZONTAL ALIGNMENT:	( )	( )	(x)
ROADWAY WIDTH:	( )	( )	(x)
SHOULDER WIDTH:	( )	(x)	( )
VERTICAL GRADES:	( )	( )	(x)
CROSS SLOPES:	( )	( )	(x)
STOPPING SIGHT DISTANCE:	( )	( )	(x)

- Design Exceptions to controlling criteria anticipated:

	UNDETERMINED	YES	NO
SUPERELEVATION RATES:	( )	( )	(x)
HORIZONTAL CLEARANCE:	( )	(x)	( )
SPEED DESIGN:	( )	( )	(x)
VERTICAL CLEARANCE:	( )	( )	(x)
BRIDGE WIDTH:	( )	( )	(x)
BRIDGE STRUCTURAL CAPACITY:	( )	( )	(x)

- Design Variances: None anticipated.
- Environmental concerns: A Categorical Exclusion is anticipated.
- Level of environmental analysis:
  - Are Time Savings Procedures appropriate? Yes (x), No ( ),
  - Categorical Exclusion (x),
  - Environmental Assessment/Finding of No Significant Impact (FONSI) ( ), or
  - Environmental Impact Statement (EIS) ( ).
- Utility involvements: unknown at this time.

Project responsibilities:

- Design, GDOT
- Right of Way Acquisition, NA
- Relocation of Utilities, NA
- Letting to contract, GDOT
- Supervision of construction, GDOT
- Providing material pits, contractor
- Providing detours. NA

Coordination

- Initial Concept Meeting date and brief summary.
- Concept meeting date and brief summary.
- P. A. R. meetings, dates and results. Not Applicable
- Public involvement. *None*
- Local government comments. *None*

- Other projects in the area.

Project ID	Project	Description	Let Date
M003234	CSNHS-M003-00(234)	Resurface and Maintain I-20 fr CR5154 to SR124/Turner Hill Rd	1/2007
714085	NH-20-2(179)	I-20 ATMS Comm/Surveillance fm I-285 to SR138/SR20	4/2010
0003166	MSL-0003-00(166)	I-20 fm Evans Mill Rd to Salem Rd HOV lanes	3/2012
0006888	CSSTP-0006-00(888)	CR 627/Sigman Rd fr Turner Hill to Rockdale Co.	12/2009
0005955	CSSTP-0005-00(955)	SR 12/Covington Hwy fr SR 124 to CR 67/Lake Capri Rd	9/2011
752210	STP-9335(3)	Sigman Rd fr Old Covington north to SR 20/138 (east leg)	LR
752215	STP-9335(5)	CR 435/Sigman Rd grade separation @CSX Railroad east of I-20	12/2010
731048	NH-035-1(33)	I-20 @ SR 138/SR 20 Interchange reconstruction & widening	6/2010
752390	STP-9338(5)	CR 437/Klondike Rd fm CR 438/Smyrna Rd to Johnson Spur	4/2010
0004647	MSL-0004-00(647)	CR 444/Iris Dr @ McDaniel Mill Rd – GRTA	5/2007

- Other coordination to date. *None*
- Railroads *None*

Scheduling – Responsible Parties' Estimate

- Time to complete the environmental process: 4 Months.
- Time to complete preliminary construction plans: 4 Months.
- Time to complete right of way plans: NA
- Time to complete the Section 404 Permit: NA
- Time to complete final construction plans: 1 month
- Time to complete to purchase right of way: NA
- List other major items that will affect the project schedule: NA
- Estimated time to complete construction: 24 months.

Other alternates considered: This project will maintain the safe condition of the roadway. A No-build alternative will not satisfy the project scope. No other alternatives are considered.

Comments: A Value Engineering Study will be required for this project.

Attachments:

1. Cost Estimates
2. Typical Sections
3. Crash Summary

SCORING RESULTS AS PER TOPPS 2440-2

Project Number:	**County:**	**PI No.:**

Report Date:	**Concept By:**
	DOT Office:
☐ CONCEPT	
	Consultant:

Project Type: Choose One From Each Column			
	☐ Major ☐ Minor	☐ Urban ☐ Rural	☐ ATMS ☐ Bridge ☐ Building ☐ Interchange ☐ Intersection ☐ Interstate ☐ New Location ☐ Widening & Reconstruction ☐ Miscellaneous

FOCUS AREAS	**SCORE**	**RESULTS**
Presentation		
Judgement		
Environmental		
Right of Way		
Utility		
Constructability		
Schedule		

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

PLAN OF PROPOSED
PROJECT NO: CSNHS-M003-00(235)
P.I. NO.: M003235
COUNTY: DEKALB, ROCKDALE

FEDERAL ROUTE I-20
STATE ROUTE: 420

IS LOCATED: 19% WITHIN CONGRESSIONAL DISTRICT NO.4
81% WITHIN CONGRESSIONAL DISTRICT NO. 13

IS LOCATED: 19% WITHIN DEKALB COUNTY
81% WITHIN ROCKDALE COUNTY

DEKALB IS COUNTY NO. 067
ROCKDALE IS COUNTY NO. 057

MID-POINT COORDINATES (X,Y):(N xxxxxxx.xxxx, E xxxxxxx.xxxx) WEST ZONE
COMPLETED PLANS: February 15, 2007

LENGTH OF PROJECT IN MILES

TOTAL

NET LENGTH OF PROJECT 7.54
NET LENGTH OF EXCEPTIONS 0.00
GROSS LENGTH OF PROJECT 7.54

PRESENT TRAFFIC: 133,200 A.D.T.

PROJECT NO. CSNHS-M003-00(235)
COUNTY: DEKALB, ROCKDALE

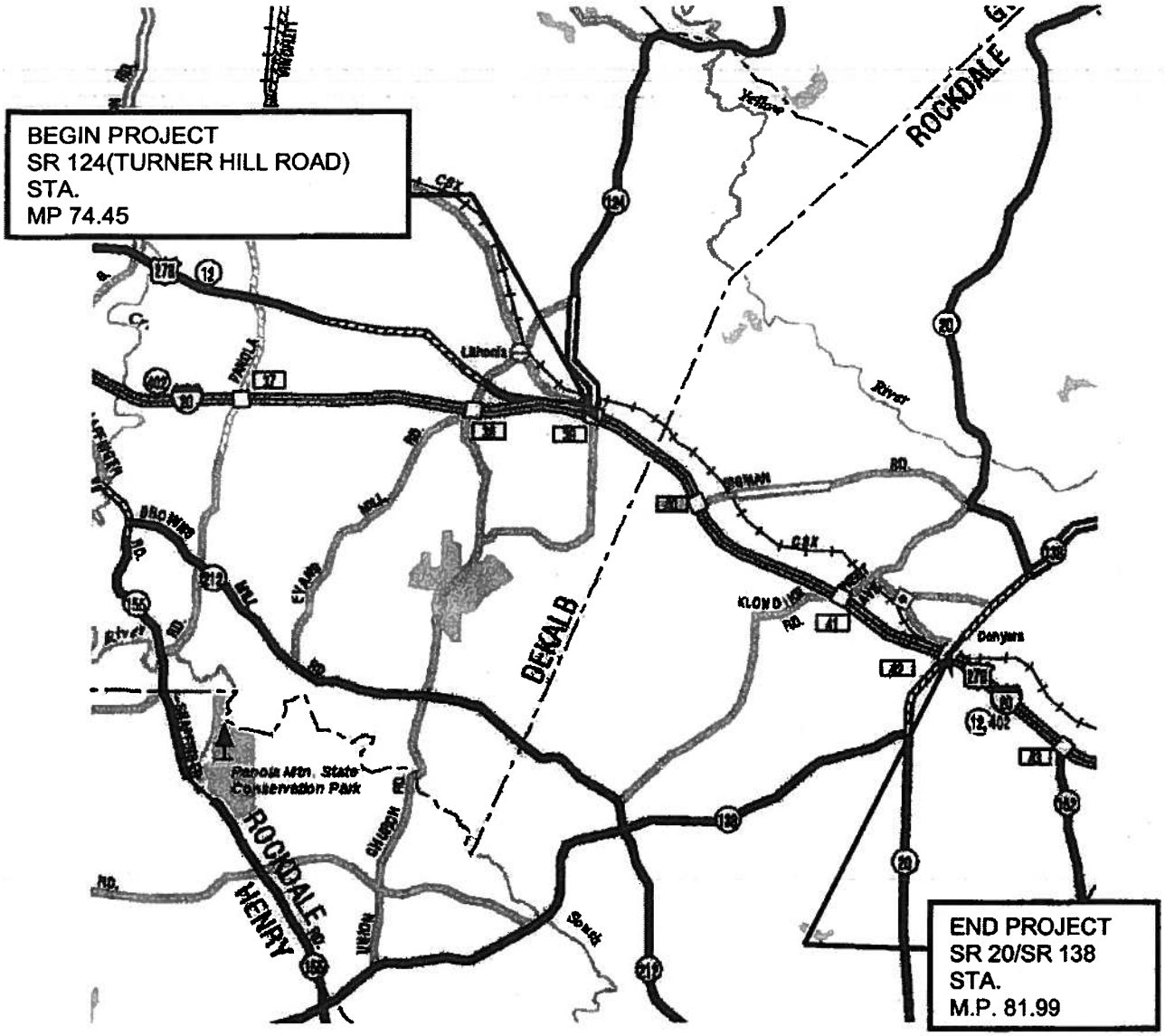
INDEX

PROJECT LOCATION MAP

CSNHS-M003-00(235)

1-20 FROM SR 124/TUNER HILL ROAD TO SR 20/SR 138

P.I. NO. M003235



GENERAL NOTES

1. ALL REFERENCES IN THIS DOCUMENT, WHICH INCLUDES ALL PAPERS, WRITINGS, DOCUMENTS, DRAWINGS, OR PHOTOGRAPHS USED, OR TO BE USED, IN CONNECTION WITH THIS DOCUMENT, TO THE STATE HIGHWAY DEPARTMENT OF GEORGIA, STATE HIGHWAY DEPARTMENT, GEORGIA STATE HIGHWAY DEPARTMENT, HIGHWAY DEPARTMENT, OR DEPARTMENT WHEN THE CONTEXT THEREOF MEANS THE STATE HIGHWAY DEPARTMENT OF GEORGIA, AND SHALL BE DEEMED TO MEAN, THE DEPARTMENT OF TRANSPORTATION.

2. THE DATA, TOGETHER WITH ALL OTHER INFORMATION SHOWN ON THESE PLANS, OR IN ANY WAY INDICATED THEREBY, WHETHER BY DRAWINGS OR NOTES, OR IN ANY OTHER MANNER, ARE BASED UPON FIELD INVESTIGATIONS AND ARE BELIEVED TO BE INDICATIVE OF ACTUAL CONDITIONS. HOWEVER, THE SAME ARE SHOWN AS INFORMATION ONLY, ARE NOT GUARANTEED AND DO NOT BIND THE DEPARTMENT OF TRANSPORTATION IN ANY WAY. THE ATTENTION OF THE BIDDER IS SPECIFICALLY DIRECTED TO SECTIONS 102.04, 102.05, AND 104.03 OF THE SPECIFICATIONS.

3. THE ATTENTION OF THE CONTRACTOR IS SPECIFICALLY DIRECTED TO SECTION 107.09 OF THE SPECIFICATIONS REGARDING BARRICADES, DANGER, WARNING, AND DETOUR SIGNS.

4. SELECTED GEORGIA STANDARDS HAVE BEEN ADDED TO THE PLANS FOR THE CONTRACTOR'S USE AND INFORMATION. IF LARGER COPIES OF THE GEORGIA STANDARDS ARE DESIRED, THE CONTRACTOR SHALL CONTACT THE D.O.T. AREA ENGINEER.

5. THE CONTRACTOR SHALL USE SIX (6) VARIABLE MESSAGE BOARDS ON THIS PROJECT. COORDINATION OF USAGE SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER.

6. LEVELING COURSE TO BE PLACED AS DIRECTED BY ENGINEER.

7. THE REMOVAL OF MILLED ASPHALT IN THE MAINLINE TRAVEL LANES AND INSIDE SHOULDER SHALL BE INCLUDED IN THE BID PRICE FOR 432-5010 – MILL ASPH CONC PVMT, VARIABLE DEPTH. THE REMOVAL OF ALL EXISTING OUTSIDE SHOULDER ASPHALT, SUBGRADE MATERIAL AND OTHER INCIDENTAL ITEMS TO ATTAIN THE DEPTH FOR PLACEMENT OF NEW MATERIALS SHALL BE INCLUDED IN THE OVERALL BID PRICE FOR 210-0100 – GRADING COMPLETE.

8. THE CONTRACTOR SHALL RECONSTRUCT THE EARTH SHOULDERS IN ACCORDANCE WITH DETAILS AND NOTES IN THE PLANS. THE RECONSTRUCTION SHALL INCLUDE GRADING, FURNISHING AND PLACEMENT OF BORROW MATERIAL. THE COST OF WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR GRADING COMPLETE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE REQUIRED EARTHWORK QUANTITIES. RECONSTRUCTION WORK SHALL BE PERFORMED AND PAID FOR IN ACCORDANCE WITH SECTION 210 OF THE SPECIFICATIONS EXCEPT AS NOTED IN DETAILS.

9. ALL AREAS THAT ARE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED AND STABILIZED TO FINAL GRADE. THE COST FOR GRADING SHALL BE INCLUDED IN THE OVERALL PRICE BID FOR GRADING COMPLETE 210-0100.

10. ALL GUARDRAIL AND GUARDRAIL ANCHORS REMOVAL SHALL BE INCLUDED IN THE OVERALL BID PRICE FOR 210-0100 - GRADING COMPLETE.

11. ALL WORK ON GUARDRAIL SHALL BE COMPLETED AT EACH LOCATION NO LATER THAN TWENTY-FOUR (24) HOURS AFTER THE REMOVAL OF THE EXISTING GUARDRAIL AT THAT LOCATION. FAILURE TO COMPLETE THIS ACTIVITY SHALL RESULT IN THE ASSESSMENT OF LIQUIDATED DAMAGES AS SET FORTH BY SECTION 108.08.

12. EXPOSED FIXED OBJECTS WITHIN THE CLEAR ZONE SHALL BE TEMPORARILY PROTECTED BY THE USE OF TEMPORARY CONCRETE MEDIAN BARRIER AND PORTABLE IMPACT ATTENUATORS. THE COST FOR TEMPORARY ATTENUATORS SHALL BE INCLUDED IN THE OVERALL BID PRICE FOR TRAFFIC CONTROL.

13. GUARDRAIL DELINEATORS, SEE SPECIAL PROVISION 641, ARE REQUIRED IN ADDITION TO THE REFLECTORIZED GUARDRAIL WASHERS FOR ALL NEW GUARDRAIL INSTALLATION AS DETAILED IN STANDARD 4360. COST FOR THE GUARDRAIL DELINEATORS SHALL BE INCLUDED IN THE PRICE BID FOR 641-1200 PAY ITEM.

14. THE CONTRACTOR SHALL PAVE UNDER ALL GUARDRAIL AS DETAILED ON THE CONSTRUCTION DETAIL IN THE PLANS AT LOCATIONS NOTED IN THE GUARDRAIL LOG SHEETS. THE COST FOR THIS WORK SHALL BE INCLUDED IN THE OVERALL BID PRICE FOR PAY ITEMS 402-3130 AND 402-3190.

15. NEW GUARDRAIL AND GUARDRAIL ANCHORS SHALL BE INSTALLED AT THE LOCATIONS IDENTIFIED ON THE GUARDRAIL SUMMARY SHEETS.

16. AT THE END OF EACH WORKDAY, THE CONTRACTOR SHALL INSTALL A STANDARD TERMINAL END SECTION ON THE END OF EACH RUN OF GUARDRAIL THAT HAS NOT BEEN COMPLETELY INSTALLED. THIS WORK SHALL BE PERFORMED AT NO ADDITIONAL COST TO THE DEPARTMENT.

17. THE CONTRACTOR SHALL STAGE HIS OPERATIONS TO PROVIDE POSITIVE DRAINAGE SUCH THAT WATER DOES NOT POND ON THE ROADWAY OR SHOULDERS.

18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL DRAINAGE STRUCTURES WITHIN THE LIMITS OF THE PROJECT THROUGHOUT THE DURATION OF THE PROJECT. ANY DEBRIS THAT GOES IN DRAINAGE STRUCTURES AS A RESULT OF THE CONTRACTOR'S OPERATIONS SHALL BE CLEANED OUT BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE DEPARTMENT.

19. THE CONTRACTOR SHALL GRASS AT ALL ROADSIDE AREAS DISTURBED BY HIS WORK AND AT ALL AREAS OF SHOULDER RECONSTRUCTION. GRASSING SHALL BE PERFORMED AND PAID FOR IN ACCORDANCE WITH SECTION 700 OF THE SPECIFICATIONS.

20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY INSTALLING EROSION CONTROL DEVICES AT ALL AREAS OF EARTH SHOULDER RECONSTRUCTION WORK. EROSION CONTROL SHALL BE PERFORMED AND PAID FOR IN ACCORDANCE WITH SECTION 162, 163, 165, AND 171 OF THE SPECIFICATIONS.

21. THIS PROJECT DOES REQUIRE A NOI.

22. TEMPORARY STRIPING IS REQUIRED IN ACCORDANCE WITH SECTION 150.04 OF GEORGIA SPECIFICATIONS WITH ALL STRIPING BEING 5 INCHES IN WIDTH.

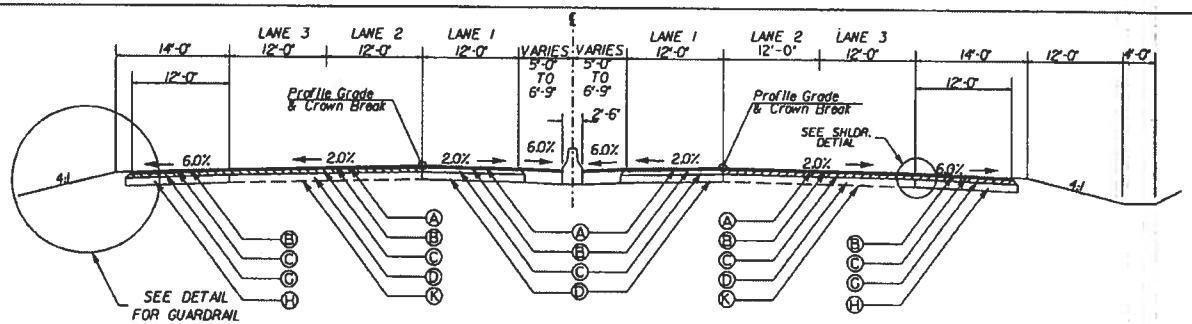
23. ALL EXISTING OVERHEAD SIGNS SHALL REMAIN IN PLACE UNTIL THE NEW STRUCTURES ARE INSTALLED.

24. THE CONTRACTOR SHALL JACK THE EXISTING OVERPASS STRUCTURE (BRIDGE ID 247-0019-A) AT THE CR437-WEST AVENUE INTERCHANGE TO PROVIDE A MINIUM VERTICAL CLEARANCE OF 16'-9" OVER ALL TRAVEL LANES AND SHOULDERS.

25. CONTRACTOR SHALL VERIFY ALL BEGIN AND END LOCATIONS FOR GUARDRAIL WITH DISTRICT PERSONNEL.

26. NO WORK IS ALLOWED WITHIN THE STREAM BUFFER ZONES.

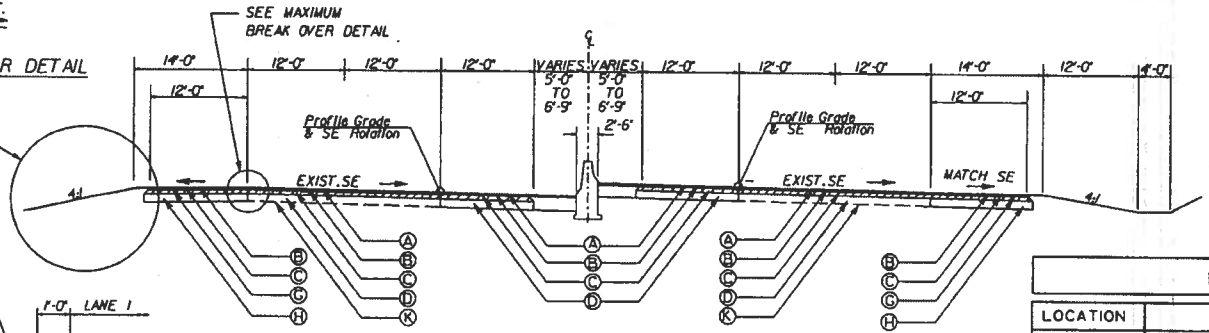
27. THE CONTRACTOR SHALL EXCAVATE SOFT AREAS IN THE SUBGRADE AND REPLACE THE EXCAVATED MATERAIL WITH GAB. THE COST OF EXCAVATING AND DISPOSING OF THE UNDERCUT MATERIAL SHALL BE PAID ACCORDING TO ITEM 210-0100 GRADING COMPLETE.



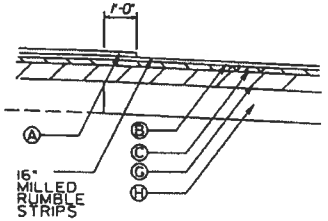
I-20 TANGENT SECTION

SE	SHOULDER SLOPE
2%	6%
3%	5%
4%	4%
5%	3%
6%	2%
7%	1%
8%	0%

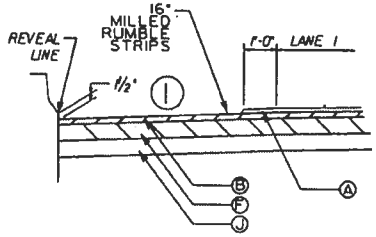
MAXIMUM BREAK OVER DETAIL



I-20 SUPERELEVATED SECTION

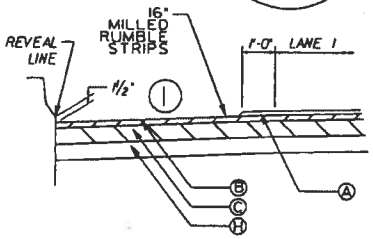


OUTSIDE SHOULDER DETAIL



(1) MILL VAR. DEPTH AT INSIDE SHOULDER PAVEMENT TO PROVIDE 1.5" REVEAL AT MEDIAN BARRIER

INSIDE SHOULDER DETAIL
ALTERNATE "B"

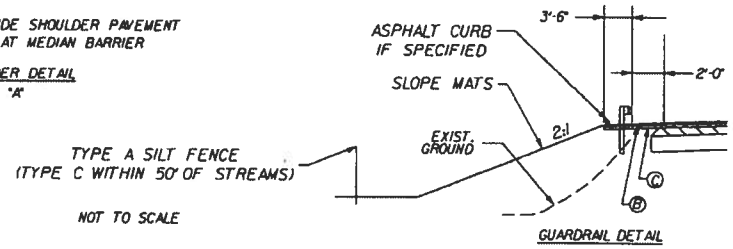


(1) MILL VAR. DEPTH AT INSIDE SHOULDER PAVEMENT TO PROVIDE 1.5" REVEAL AT MEDIAN BARRIER

INSIDE SHOULDER DETAIL
ALTERNATE "A"

MILL DEPTHS

LOCATION	DESCRIPTION
INSIDE SHOULDER	MILL TO 5½" BELOW THE REVEAL LINE ON THE BARRIER
LANE 1	MILL TO 4½"
LANES 2&3	MILL 7½" WHERE EXISTING PAVEMENT IS FULL DEPTH ASPHALT MILL TO PCC PAVEMENT WHERE PRESENT

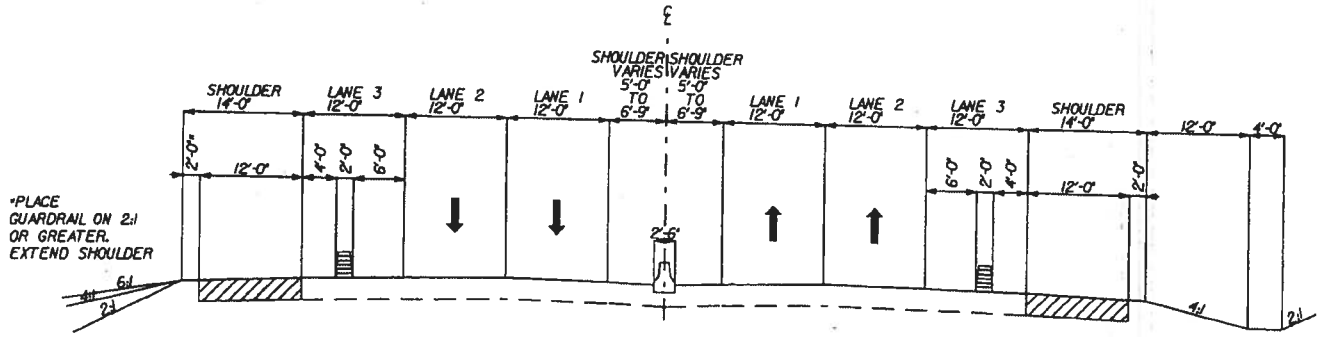


GUARDRAIL DETAIL

PAVEMENT DESIGN

SYMBOL	PAVEMENT SYMBOLS LEGEND DESCRIPTION	
A	ASPH CONC 12.5MM PEM, GP2 ONLY, INCL POLYMER-MODIFIED BITUM MATL & H LIME	135 lb./sq.yd.
B	ASPH CONC 12.5MM SMA, GP2, ONLY, INCL POLYMER-MODIFIED BITUM MATL & H LIME	220 lb./sq.yd.
C	RECYCLED ASPH CONC 19MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	440 lb./sq.yd.
D	RECYCLED ASPH CONC 25MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	330 lb./sq.yd.
F	RECYCLED ASPH CONC 19MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	550 lb./sq.yd.
G	RECYCLED ASPH CONC 25MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	1210 lb./sq.yd.
H	GR AGGR BASE CRS, INCL MATL	12 INCHES
J	GR AGGR BASE CRS, INCL MATL	8 INCHES
K	EXIST. PAVEMENT; PCC FROM MP 74.45 TO 75.59, ASPHALT FROM MP 75.59 TO 81.99	

STAGING TYPICAL SECTIONS
SHEET 1 of 6



I-20

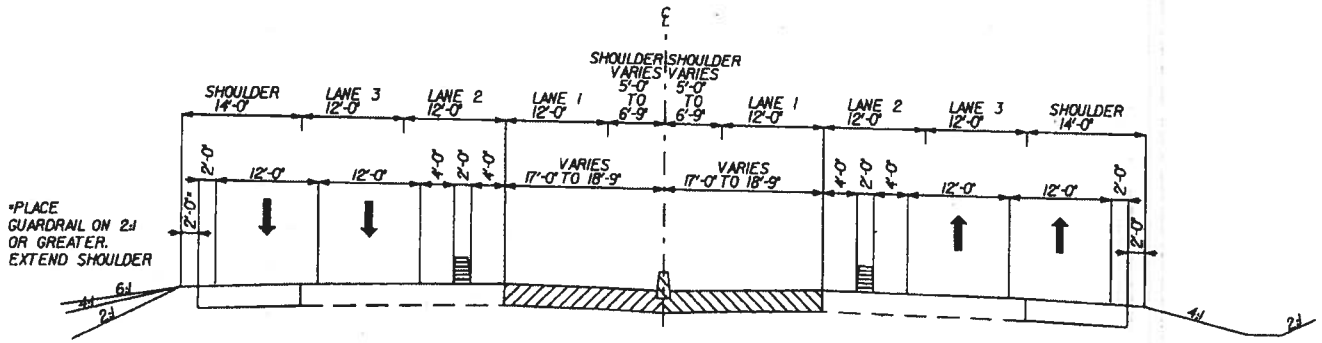
SR 124 TURNER HILL RD. TO SR 20 / SR138

STAGE 1

1. REGRADE SHOULDER AND REPLACE GUARDRAIL.
2. RECONSTRUCT FULL DEPTH OUTSIDE SHOULDER USING SINGLE LANE CLOSURES IN ACCORDANCE WITH SPECIFICATION 150JI.
3. OUTSIDE SHOULDERS SHALL MEET THE SURFACE TOLERANCE REQUIREMENTS FOR THE INTERSTATE MAINLINE TRAVELED WAY (400.3.06.6.2)

PROJECT NO: CSNHS-M003-00(215)
COUNTY: DEKALB, ROCKDALE

STAGING TYPICAL SECTIONS
SHEET 2 of 6



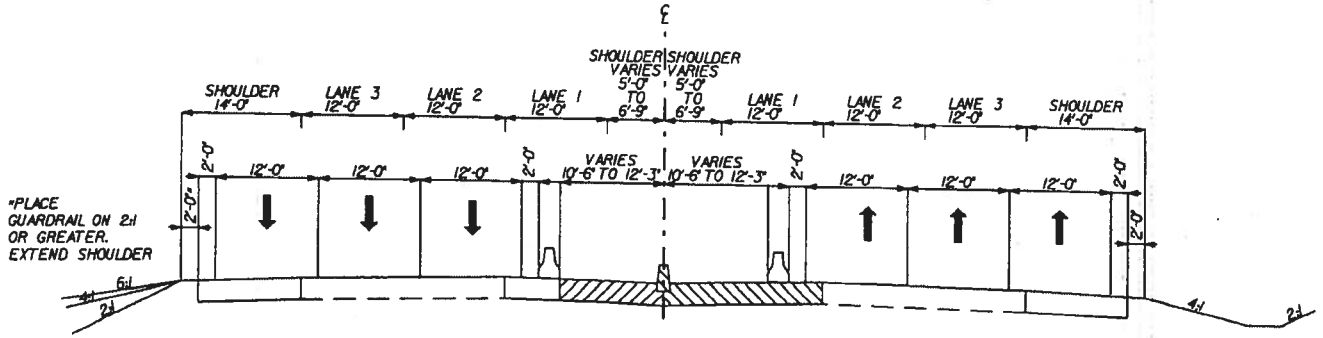
I-20

SR 124 TURNER HILL RD. TO SR 20 / SR 138

STAGE 2

1. RESTRIPE AS NOTED AND SHIFT TRAFFIC.
2. RECONSTRUCT FULL DEPTH INSIDE SHOULDER AND MEDIAN BARRIER.
3. MILL AND INLAY USING SINGLE LANE CLOSURES IN ACCORDANCE WITH SPECIFICATION 150JI.
4. RECONSTRUCT DRAINAGE STRUCTURES IN MEDIAN.
5. DO NOT PLACE PEM.

PROJECT NO. CSNHS-4003-00(235)
COUNTY: DEKALB, ROCKDALE



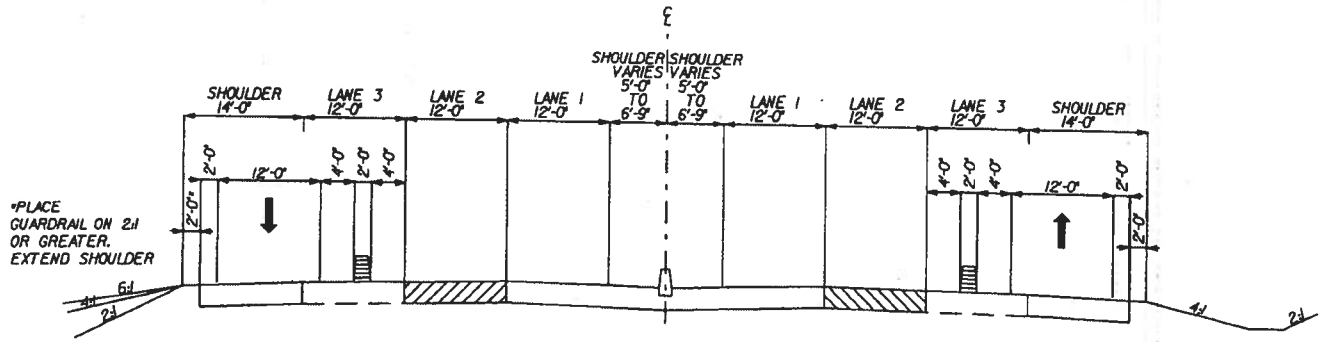
I-20

SR 124 TURNER HILL RD. TO SR 20 / SR 138

STAGE 2A (MAY BE USED IF BARRIER IS BEING REPLACED)

1. RESTRIPE AS NOTED AND SHIFT TRAFFIC.
2. RECONSTRUCT FULL DEPTH INSIDE SHOULDER AND MEDIAN BARRIER
3. MILL AND INLAY USING SINGLE LANE CLOSURES IN ACCORDANCE WITH SPECIFICATION 150JI.
4. RECONSTRUCT DRAINAGE STRUCTURES IN MEDIAN.
5. DO NOT PLACE PEM.

PROJECT NO: CSNHS-M003-00(235)
COUNTY: DEKALB, ROCKDALE



I-20

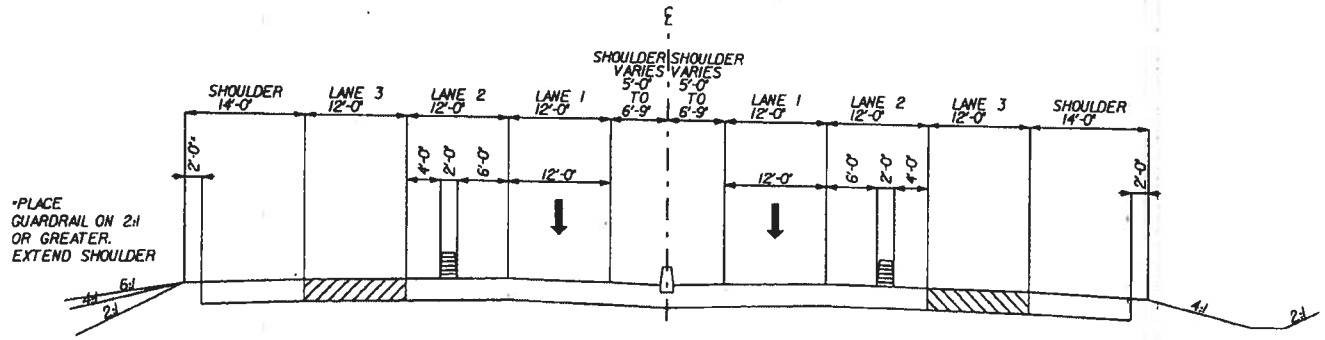
SR 124 TURNER HILL RD. TO SR 20 / SR 138

STAGE 3

1. RESTRIPE AS NOTED AND SHIFT TRAFFIC.
2. MILL AND INLAY USING SINGLE LANE CLOSURES IN ACCORDANCE WITH SPECIFICATION 150.11.
3. DO NOT PLACE PEM.

PROJECT NO: CSNHS-M003-00(235)
COUNTY: DEKALB, ROCKDALE

STAGING TYPICAL SECTIONS
SHEET 5 of 6



I-20

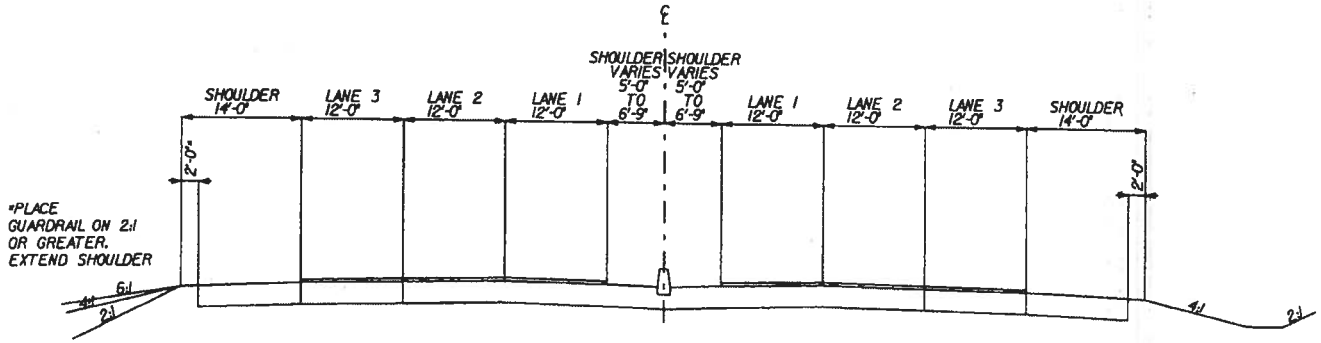
SR. 124 TURNER HILL RD. TO SR 20 / SR 138

STAGE 4

1. RESTRIPE AS NOTED AND SHIFT TRAFFIC.
2. MILL AND INLAY USING SINGLE LANE CLOSURES IN ACCORDANCE WITH SPECIFICATION 150.II.

PROJECT NO. CSNHS-M003-00(235)
COUNTY: DEKALB, ROCKDALE

STAGING TYPICAL SECTIONS
SHEET 6 of 6



I-20

SR 124 TURNER HILL RD. TO SR 20 / SR 138

STAGE 5

1. REPEAT STAGE 2 AND 3 TO PLACE PEM.
2. PLACE FINAL STRIPING.

PROJECT NO. CSNHS-M003-00(235)
COUNTY: DEKALB-ROCKDALE

Estimate Report for file "CSNHS-M003-00(235) "

Section ROADWAY

Item Number	Quantity	Units	Unit Price	Item Description	Cost
150-1000	1	LS	4000000.00	TRAFFIC CONTROL - M003235	4000000.00
153-1300	1	EA	75833.87	FIELD ENGINEERS OFFICE TP 3	75833.87
202-2100	1	LS	74000.00	CLEARING	74000.00
210-0100	1	LS	1000000.00	GRADING COMPLETE - M003235	1000000.00
310-1101	95500	TN	24.32	GR AGGR BASE CRS, INCL MATL	2322560.00
400-3604	53600	TN	78.08	ASPH CONC 12.5 MM SMA, GP 2 ONLY, INCL POLYMER-MODIFIED BITUM MATL & H LIME	4185088.00
400-3624	22500	TN	75.00	ASPH CONC 12.5 MM PEM, GP 2 ONLY, INCL POLYMER-MODIFIED BITUM MATL & H LIME	1687500.00
402-3121	137600	TN	75.00	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	10320000.00
402-3190	98500	TN	75.00	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	7387500.00
413-1000	124300	GL	2.00	BITUM TACK COAT	248600.00
429-1000	6550	EA	695.34	RUMBLE STRIPS	4554477.00
432-5010	318500	SY	5.09	MILL ASPH CONC PVMT, VARIABLE DEPTH	1621165.00
518-1000	1	LS	182454.00	RAISE EXISTING BRIDGE, STA -	182454.00
610-0716	30340	LF	37.97	REM CONC MEDIAN BARRIER	1152009.80
611-8040	86	EA	1304.72	ADJUST DROP INLET TO GRADE	112205.92
621-3007	630	LF	216.79	CONCRETE BARRIER, TYPE 7M	136577.70
621-3020	19423	LF	128.00	CONCRETE BARRIER, TYPE 20	2486144.00
621-3021	4486	LF	153.50	CONCRETE BARRIER, TYPE 21	688601.00
621-3022	5800	LF	285.21	CONCRETE BARRIER, TYPE 22	1654218.00
632-0003	2	EA	12224.86	CHANGEABLE MESSAGE SIGN, PORTABLE, TYPE 3	24449.72
641-1100	600	LF	56.49	GUARDRAIL, TP T	33894.00
641-1200	8050	LF	17.11	GUARDRAIL, TP W	137735.50
641-5001	4	EA	613.61	GUARDRAIL ANCHORAGE, TP 1	2454.44
641-5006	8	EA	575.57	GUARDRAIL ANCHORAGE, TP 6	4604.56
641-5012	12	EA	1753.33	GUARDRAIL ANCHORAGE, TP 12	21039.96
				Section Sub Total:	**$44,113,112.47**

Section EROSION CONTROL

Item Number	Quantity	Units	Unit Price	Item Description	Cost
163-0232	37	AC	571.95	TEMPORARY GRASSING	21162.15
163-0240	333	TN	291.39	MULCH	97032.87
163-0300	2	EA	2388.13	CONSTRUCTION EXIT	4776.26
165-0030	39600	LF	2.05	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	81180.00
167-1000	2	EA	1542.18	WATER QUALITY MONITORING AND SAMPLING	3084.36
167-1500	24	MO	977.26	WATER QUALITY INSPECTIONS	23454.24
171-0030	79200	LF	4.09	TEMPORARY SILT FENCE, TYPE C	323928.00
700-6910	74	AC	1021.10	PERMANENT GRASSING	75561.40
700-7000	222	TN	68.87	AGRICULTURAL LIME	15289.14
700-7010	185	GL	22.38	LIQUID LIME	4140.30
700-8000	67	TN	320.49	FERTILIZER MIXED GRADE	21472.83
700-8100	3700	LB	3.08	FERTILIZER NITROGEN CONTENT	11396.00
				Section Sub Total:	**$682,477.55**

Section SIGNING & MARKING

Item Number	Quantity	Units	Unit Price	Item Description	Cost
653-1501	65480	LF	0.86	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, WHITE	56312.80
653-1502	65480	LF	0.84	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, YELLOW	55003.20
653-1810	5590	LF	0.95	THERMOPLASTIC SOLID TRAF STRIPE, 10 IN, WHITE	5310.50
653-3501	131000	GLF	0.53	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, WHITE	69430.00
654-1003	2150	EA	4.43	RAISED PVMT MARKERS TP 3	9524.50
				Section Sub Total:	**$195,581.00**

Total Estimated Cost: $44,991,171.02

Subtotal Construction Cost	**$44,991,171.02**
E&C Rate 10.0 %	$4,499,117.10
Inflation Rate 0.0 % @ 0.0 Years	$0.00
Total Construction Cost	**$49,490,288.12**
Right Of Way	$0.00
~~ReImb. Utilities~~	~~$0.00~~
Grand Total Project Cost	**$49,490,288.12**

LAB FINDINGS

P.I. NO. M003235
CSNHS-M003-00(235)
I-20 fm SR 12/Turner Hill Road (Dekalb) to SR 20/SR 138 (Rockdale)
June 23, 2006

Spoke w/ AJ Jubran of OMR and their findings and recommendations are as follows:

Existing Conditions

MP 74.45 to MP 75.59
Lane #1: consist of 16" of Asphalt over GAB
Lane #2 & 3: consist of 7.5" of Asphalt over PCC

MP 75.59 to MP 81.99
Lane #1: consist of 16" of Asphalt over GAB, soil cement base, or soil aggregate base
Lane # 2 & 3: consist of 7.5" of Asphalt over PCC

*Existing shoulder is in poor conditions (3" of asphalt over GAB)

Recommendations

Entire Length of Project (both directions)
Lane #1: Lab recommends milling 4.5" of the existing 7.5" depth of Asphalt and replacing the milled section with 4" of 19mm, 2" of 12.5mm SMA, and 1.25" of PEM.

Entire Length of Project (both directions)
Lane # 2 & 3: Lab recommends milling the entire depth of the existing of 7.5" Asphalt down to the level of the PCC and replacing this milled section with 3" of 25mm, 4" of 19mm, 2" of 12.5mm SMA, and 1.25" of PEM.

Shoulder (outside) recommendations are:

2" of 12.5mm, 3" of 19mm, 12" of 25mm and 12" of GAB, this is recommended so that the shoulder can be utilized as proposed future lanes.

AJ Jubran stated the "by doing this it would raise the existing profile grade by 2.75"

December 13, 2006

DEPARTMENT OF TRANSPORTATION

STATE OF GEORGIA

SPECIAL PROVISION

PROJECT CSNHS-M003-00(235) DEKALB, ROCKDALE COUNTY

P.I. NO. M003235

Section 150 – Traffic Control

Add the following:

150.11 Special Conditions

A. Lane closures, detours, pacing of traffic, moving equipment or material, and other activities shall not be allowed on I-20 except during the hours shown below. "Weekdays" shall be deemed to mean Monday through Thursday.

1. I-20 Eastbound From SR 124 Turner Hill Road to SR20/SR138

a) The following are the allowable times for Single Lane Closures:
Weekdays from 7:00 PM to 5:00 AM
Friday 7:00 PM – Monday 5:00 AM

b) The following are the allowable times for Double Lane Closures:
Weekdays 11:00 PM – 5:00 AM
Friday 8:00 PM – Saturday 8:00 AM
Saturday 8:00 PM – Sunday 8:00 AM
Sunday 8:00 PM – Monday 5:00 AM

B. Lane Closures

1. Interstate Closure: Closure of the Interstate (SR401) as detailed in the drawings for the purposes of jacking the bridge (Bridge ID 247-0019-A) at CR437 West Avenue shall be allowed between the hours of 8:00 PM Friday through 5:00 AM Monday for one weekend, except weekends designated in Sub-Section 105.11 D or 150.11 E below. Single lane closures will be allowed in accordance with Section 150.11A for placement of the Method 5 barrier, signing and striping needed for detour implementation. No other lane closures will be allowed while the Interstate is in the detour condition.

2. Road Closure: Closure of West Avenue as detailed in the drawings for the purposes of jacking the bridge (Bridge ID 247-0019-A) at CR437 West Avenue shall be allowed between the hours of 8:00 PM Friday through 5:00 AM Monday for one weekend, except weekends designated in Sub-Section 105.11 D or 150.11 E below.

C. Failure to reopen lanes by the time as specified above will result in the assessment of Liquidated Damages as per Sub-Section 108.08 C of this Contract.

D. Holiday Work Restrictions

Work that interferes with traffic shall not be allowed during the following holiday periods:

July 4: June 29th – July 5th 2007; July 3rd – July 7th, 2008; inclusive.

Labor Day: August 31st – September 4th, 2007; August 29th – September 2nd 2008; inclusive.

Thanksgiving through New Year: November 21st, 2007 – January 2nd, 2008; November 20th, 2008 – January 2nd, 2009; inclusive.

E. Special Event Restrictions:

Lane closures shall not be allowed during the weekends which conflict with special events, including the Tax Free Days in Georgia. Additional restrictive hours may occur prior to and after unforeseen special events and the Contractor shall obtain special approval from the Engineer prior to temporary lane closures, detours, pacing of traffic, or other activities that slow traffic.

F. Weekly Meetings with the Engineer

1. All lane closures shall have prior approval of the Engineer. No later than Wednesday of each week preceding the start of each week, the Contractor shall meet with the Engineer and submit in writing his proposed plan of operation, sequence of Work, and methods for providing safe passage of traffic for the following week.
2. For complete roadway closures, the Contractor shall meet with the Engineer and submit in writing his propos proposed plan of operation, sequence of Work, and methods for providing safe passage of traffic including detour routes no less than eight (8) weeks prior to the proposed closure.
3. For submittal requirements concerning major changes to the approved control plan, the Contractor's attention is directed to Sub-Section 150.01G.

G. Workzone Law Enforcement

Workzone law enforcement consists of utilizing uniformed police officer(s) equipped with a marked patrol vehicle and blue flashing lights to enforce traffic laws in construction workzones and the administration of this service. Payment for workzone law enforcement shall be made only for its utilization in workzones during lane closures, traffic pacing, or other activitites that occur within travel lanes. The Contractor shall be responsible for coordinating and scheduling the utilization of the Workzone Law Enforcement.

Workzone Law Enforcement will be measured and paid for by the hour up to the maximum number of hours included in the Contract. The Department will not pay for any Workzone Law Enforcement beyond the number of hours included in the Contract. The cost for utilization above the number of hours included in the Contract shall be included in the Lump Sum price bid for Traffic Control.

The Contractor shall provide a daily work record containing the actual number of hours charged by the police officer, for all hours for which the Department will pay. The daily work record shall be compiled on a form provided by the Department, signed by the police officer and the Contractor's Worksite Traffic Control Supervisor attesting that the police officer was utilized during the hours recorded.

Payment shall be full compensation for reimbursing the law enforcement agency, and for all other costs incurred by the Contractor in coordinating, scheduling, and administering the item Workzone Law Enforcement.

Payment shall be made under:

ITEM NO. 150-9011 Traffic Control Workzone Law Enforcement (Contractor Bids)...HR

Value Engineering Process

VALUE ENGINEERING PROCESS

INTRODUCTION

This report summarizes the analysis and conclusions by the PBS&J Value Engineering workshop team as they performed a VE study during the period of January 9 - 11, 200 in Atlanta, Georgia for the Georgia Department of Transportation. The subject of the Value Engineering study was the project for the rehabilitation of I-20/SR 402 from Evans Mill Road to SR 20. This rehabilitation consists primarily of deep milling and inlay, and other related measures. The design is being performed in-house by the staff of the Georgia Department of Transportation.

The Value Engineering workshop team and its leadership were provided by PBS&J. This team consisted of the following:

Charles R. McDuff, P.E., CVS-Life	Certified Cost Value Specialist/VE Team Leader
Chris Carbuto, P.E.	Highway Design Engineer
Barry L. Brown, P.E.	Structures Engineer
Gary King	Highway Construction Specialist

The Value Engineering team followed the six step Value Engineering job plan as promulgated by SAVE International. This six step job plan includes the following:

- **Information Phase** – during this phase of the team's work, the team received a briefing from the in-house designers and project delivery team representatives of the Georgia Department of Transportation (GDOT). This briefing included discussions of the design intent behind the project, the cost concerns, and was followed by a tour of the existing facilities. In the working session that followed, the VE team developed cost models from the cost data provided by the designers and familiarized themselves with the construction drawings and other data that was available to the team. Some of the representative project information (concept report, cost estimate, and special provisions) may be found in the tabbed section of this report entitled ***Project Description***. Following this current narrative the reader will also find a cost model done in the Pareto fashion, i.e., identifying the highest costs down to the lowest costs for the larger construction cost elements. This cost model, developed by the VE team, was used by the VE team to help focus their week of work. The headings on the Pareto Chart also were used as headings for creative phase activities.

- **Function Analysis Phase** – during this phase the team reviewed the project from the simplest format in asking the questions of "What is the project supposed to do?", and "How is it supposed to accomplish this purpose?". In the Value Engineering vernacular, the answers to these questions are cast in the form of active verbs and measurable nouns. These verb/noun pairs form the basis of the function analysis which distinguishes a Value Engineering effort from a

potentially damaging cost cutting exercise. The important functions of the new project were identified as follows:

- **Project Objective/Goals**
  - **Preserve Roadway Integrity**
  - **Preserve Roadway Serviceability, and**
  - **Preserve Roadway Safety**
- **Project Basic Functions**
  - **Enhance Travel Experience**
  - **Improve Roadway Surface**
  - **Meet AASHTO/GDOT Standards**
  - **Correct Bridge Clearance**

- **Creative/Brainstorming Phase** – The VE team performed a brainstorming session to identify ideas that might help meet the project objectives:
  - Reduce construction and life cycle costs
  - Improve roadway operations
  - Reduce the time of construction
  - Clarify risks and opportunities associated with the project and acts to mitigate risks and to act on opportunities.

  This brainstorming session initially identified numerous ideas that were then evaluated in the Judgement phase. The reader will find the creative worksheets enclosed. These same work sheets were also used to record the results of the Judgment/Evaluation Phase.

- **Judgment/Evaluation Phase** – Once the team identified the creative ideas, it was necessary to decide which alternatives should be carried forward. This is the work of the Judgment or Evaluation Phase. The team reflected back on the project constraints and objectives shared with the team by the owner's representatives, in the kick-off meeting on the first day of the workshop. From that guidance, the team selected the following values as measures of whether or not an alternative had enough merit to be carried forward in the VE process:
  - Construction Cost Savings
  - Maintainability
  - Ability to Implement the Idea
  - General Acceptability of the Alternatives
  - Constructability

  Based on these measurement sticks, the VE team evaluated the alternatives and graded them from 5 (Excellent) down to 1 (Poor). Other notes about the alternatives are annotated at the bottom of the enclosed creative and evaluation sheets.

- **Development Phase** – This is the section of the report (see tabbed section number three – Study Results) in which the alternatives are explained, sketched,

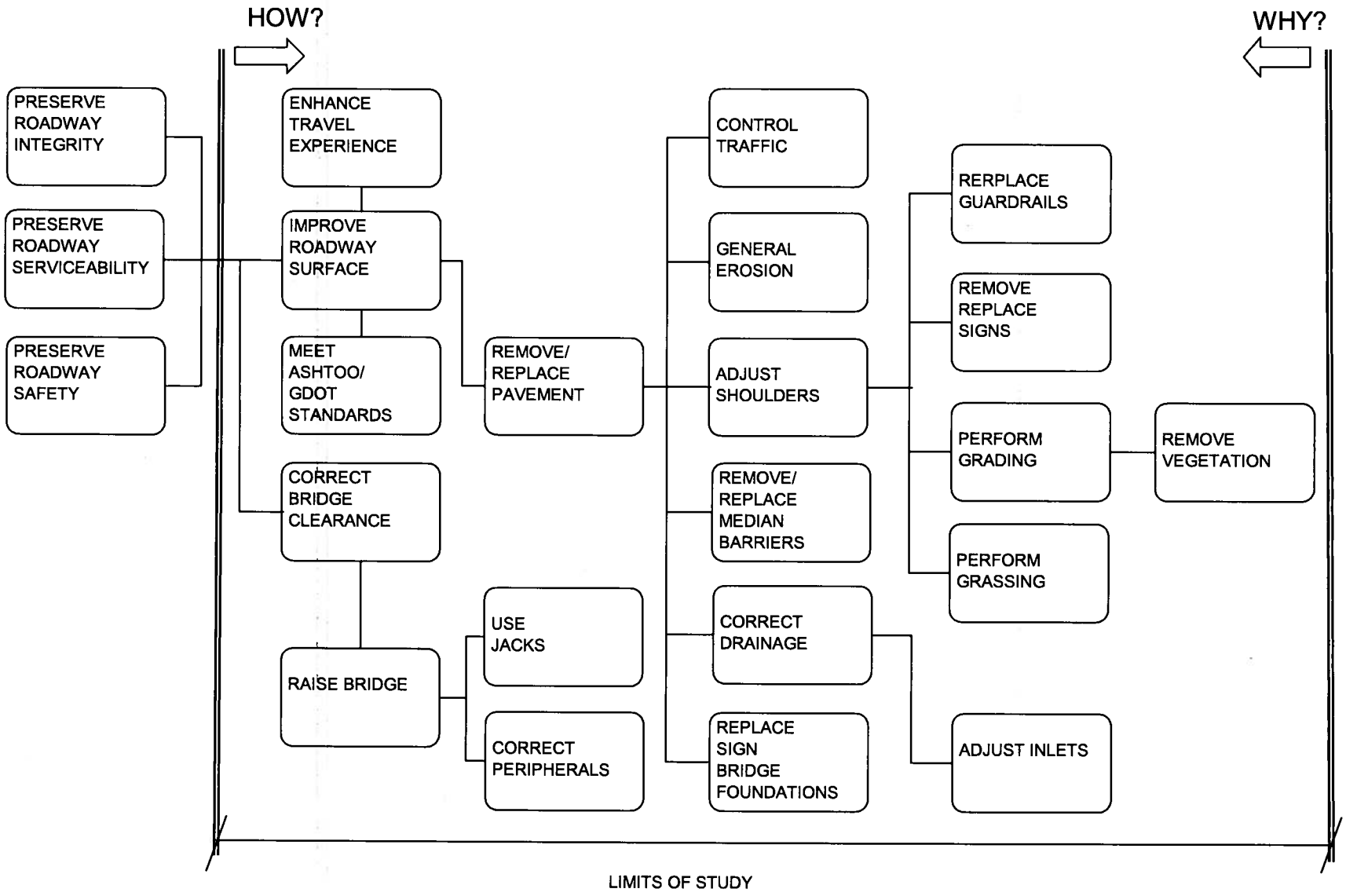
documented and put to cost and technical tests to determine their suitability for implementation and for their impact on the project.

- **Presentation Phase** – As noted earlier, the team made a final, informal out-briefing on the last day of the workshop, designed to inform the Owners and the Designers of the initial findings of the VE workshop. This written report is intended to formalize those findings.

The VE team is enclosing a copy of the attendance sheets so that the reader can be informed about who participated in the workshop proceedings. The cost models developed in the information phase are also enclosed. These cost models are presented in Pareto Fashion. This means that they are intended to highlight the high cost items in the current working estimate for the construction of the project. The high cost items were then evaluated by the VE team as to whether the team might be able to have an effect on these line items. Where it was felt that the team might affect the line items, they were typically used as the topics for the creative phase.

FUNCTION ANALYSIS SYSTEM TECHNIQUE DIAGRAM

(FAST)



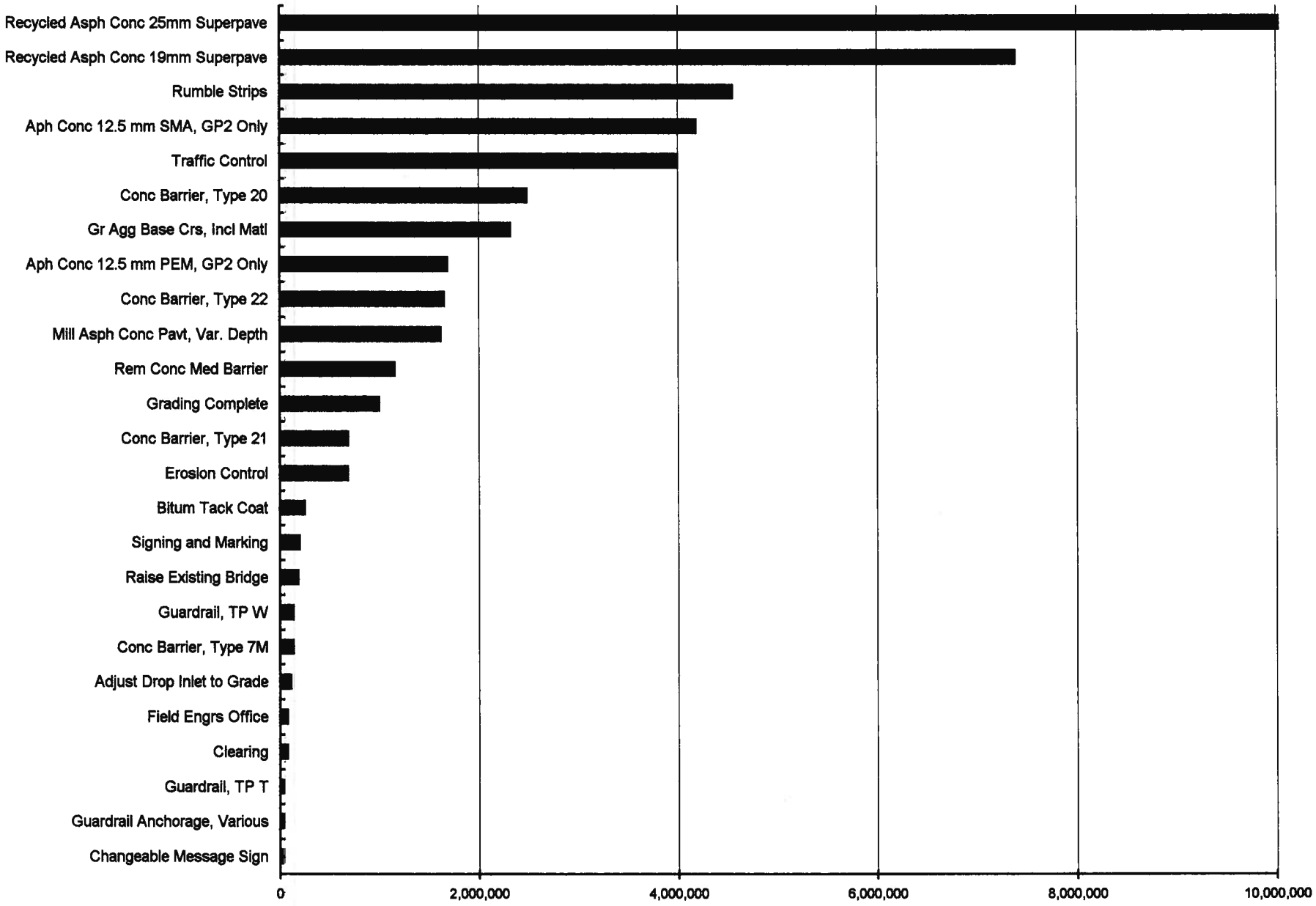
PARETO SUMMARY

Project: CSNHS-M003-00(235) -- Georgia Department of Transportation

P.I. Number: M003235 - DeKalb and Rockdale Counties

PROJECT ELEMENT		COST	PERCENT	CUM. PERCENT
Recycled Asph Conc 25mm Superpave	402-3121	10,320,000	22.94%	22.94%
Recycled Asph Conc 19mm Superpave	402-3190	7,387,500	16.42%	39.36%
Rumble Strips	429-1000	4,554,477	10.12%	49.48%
Aph Conc 12.5 mm SMA, GP2 Only	400-3604	4,185,088	9.30%	58.78%
Traffic Control	150-1000	4,000,000	8.89%	67.67%
Conc Barrier, Type 20	621-3020	2,486,144	5.53%	73.20%
Gr Agg Base Crs, Incl Matl	310-1101	2,322,560	5.16%	78.36%
Aph Conc 12.5 mm PEM, GP2 Only	400-3624	1,687,500	3.75%	82.11%
Conc Barrier, Type 22	621-3022	1,654,218	3.68%	85.79%
Mill Asph Conc Pavt, Var. Depth	432-5010	1,621,165	3.60%	89.39%
Rem Conc Med Barrier	610-0716	1,152,010	2.56%	91.95%
Grading Complete	210-0100	1,000,000	2.22%	94.18%
Conc Barrier, Type 21	621-3021	688,601	1.53%	95.71%
Erosion Control	xxx-xxxx	682,478	1.52%	97.22%
Bitum Tack Coat	413-1000	248,600	0.55%	97.78%
Signing and Marking	xxx-xxxx	195,581	0.43%	98.21%
Raise Existing Bridge	518-1000	182,454	0.41%	98.62%
Guardrail, TP W	641-1200	137,736	0.31%	98.92%
Conc Barrier, Type 7M	621-3007	136,578	0.30%	99.23%
Adjust Drop Inlet to Grade	611-8040	112,206	0.25%	99.47%
Field Engrs Office	153-1300	75,834	0.17%	99.64%
Clearing	202-2100	74,000	0.16%	99.81%
Guardrail, TP T	641-1100	33,894	0.08%	99.88%
Guardrail Anchorage, Various	641-xxxx	28,099	0.06%	99.95%
Changeable Message Sign	632-0003	24,450	0.05%	100.00%
	Subtotal	**$ 44,991,173**	**100.00%**	
E & C Rate (10.%)	**INCL**	**$ 4,499,117**		
		$ -		
		$ -		
		$ -		
		$ -		
	TOTAL	**$ 49,490,290**	**Comp Mark-up:**	10%

Pareto Chart 2



CREATIVE IDEA LISTING & EVALUATION

PBSJ

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation** SHEET NO.: **1 of 2**

P.I. Number: M003235 – DeKalb and Rockdale Counties

NO.	IDEA DESCRIPTION	RATING
	PAVEMENT REPLACEMENT (P)	
P-1	Extend working hours	4
P-2	Use PCC Pavement	3
P-3	Use different pavement design	2
P-4	Eliminate milling	2
P-5	Do not change existing cross slope	4
P-6	Selectively eliminate milling	DS
	RUMBLE STRIPS (R)	
R-1	Use raised "delineators"	2
R-2	Change spacing between strips (reduce number of strips)	2
R-3	Recapture material	1
R-4	Reduce width of strips	3
	TRAFFIC CONTROL (T)	
T-1	Use incentives to maximize open time on roadway	3
T-2	Divert traffic to existing road	1
T-3	Reduce number of Construction Phases	See Below
T-4	Place traffic in median through the use of moveable median barriers	3
T-5	Use "permanent" lane closure (give lane to contractor as reasonably needed)	2
T-6	Split traffic (Combine stages 3 and 4)	DS
T-7	Place all traffic on same side of road by reducing lanes widths and using temporary concrete barriers	3

Rating: 1→2 = Generally not acceptable; 3 = Little Opportunity for Positive Change; 4→5 = Most likely to be Developed;
DS = Design Suggestion; ABD = Already Being Done

CREATIVE IDEA LISTING & EVALUATION

PBSJ

PROJECT: **CSNHS-M003-00(235) – Georgia Department of Transportation** SHEET NO.: **2 of 2**

P.I. Number: M003235 – DeKalb and Rockdale Counties

NO.	IDEA DESCRIPTION	RATING
	CONCRETE BARRIERS (C)	
C-1	Keep all existing barriers	4
C-2	Selectively replace barriers	3
C-3	Convert Jersey face barriers to straight face barriers	3
C-4	Use barrier cap	3
C-5	Continue use of existing sign bridge foundations	3
C-6	Size and height of barrier to be modified to meet needs of future widening	DS
	GUARDRAIL (G)	
G-1	Selectively reuse rails and posts	5
G-2	Optimize slopes to minimize guardrail requirements	3
	RAISE BRIDGE (B)	
B-1	Lower pavement instead of raising bridge	2
B-2	Replace superstructure (use high strength steel beams to achieve height requirements)	1
	MISCELLANEOUS (M)	
M-1	Use completion incentives to minimize construction duration	DS
M-2	Use contractor lane purchase concept	DS
M-3	Defer this scope and make work a part of the HOV project	2
M-4	Review design components for compatibility with HOV and other planned projects	DS

Rating: **1→2 = Generally not acceptable;** **3 = Little Opportunity for Positive Change;** **4→5 = Most likely to be Developed;**
DS = Design Suggestion; **ABD = Already Being Done**

VE STUDY SIGN-IN SHEET

Project No.: CSNHS-M003-00(235) County: Dekalb Rockdale PI No.: M003235 Date: January 8-11, ~~2006~~ 2007

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(1) Attended Monday and Thursday Briefings
(2) Attended Monday Briefing
(3) Attended Friday Briefing